THE IRON AGE

May 7, 1931

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WE DO THE THRESHING

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—A. H. D.

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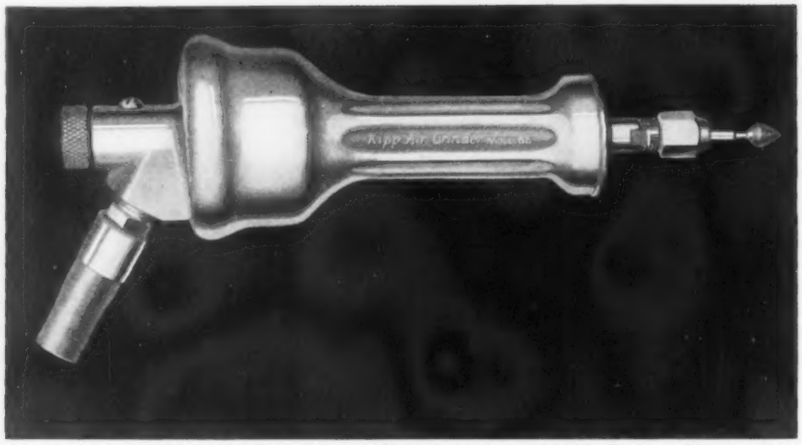
76th IRON AGE YEAR



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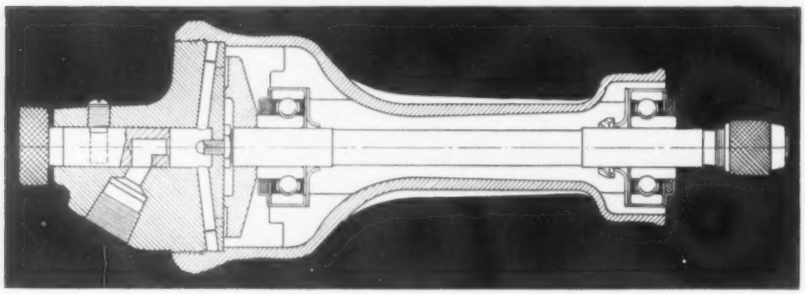
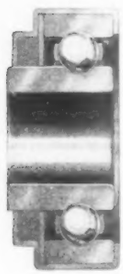
The talk of the tool room has N-D-Seals





This little grinder, not much larger than a fountain pen, is being discussed with interest in the ranks of tool- and die-makers. They talk of its speed and smoothness . . . of its lightness and portability. Air is the driving force and the one rotating part is carried on N-D-Seal Bearings. Dirt and grit cannot enter these bearings because New Departure protects them with accurate, woven felt seals. N-D-Seals are more than straight radial bearings, for they have generous capacity for thrust and combination loads as well. And they are extremely easy to install in any product. Half a million of them are performing with conspicuous success in a wide range of applications. The New Departure Manufacturing Company, Bristol, Connecticut; Detroit, Chicago, San Francisco and London.

NEW DEPARTURE BALL BEARINGS

THIS ISSUE IN BRIEF

MAY 7, 1931

Small Plants Will Not Disappear

Lower overhead, personal service to customers, ability to act quickly, better coordination, and executives' pecuniary interest in the business are advantages that insure the future of the small manufacturer.—Page 1499.

* * *

Mergers Are Not Life Preservers

Future consolidations will depend more than ever upon obvious advantages to be gained in lower production, sales and administrative costs. They will not be thrown together so hastily as in the past.—Page 1501.

* * *

Layer of Flux Anneals Pipe Welds

Electric welding takes place under a cover of flux, which prevents oxidation, and by preventing rapid loss of heat, anneals the weld.—Page 1506.

* * *

Electrically Welded Pipe Is Made Oversize

A 24-in. pipe will be about 24¼ in. in diameter. Passing through a hydraulic sizing press contracts it enough to take off excess diameter and gives it the final circular section. —Page 1506.

* * *

Pasteurizes Reclaimed Cutting Oil to Eliminate Infection

Oil recovered from chip wringer is heated electrically to 160 deg. F. and held at that temperature for 45 min. This prevents infection of the hands and arms of men at the machines.—Page 1511.

* * *

Chip Wringing and Crushing Pays Dividends

Wringing before crushing salvages maximum quantity of cutting oil. Crushed chips usually bring a higher price, floor space is saved, handling costs are cut, and car demurrage charges eliminated.—Page 1511.

* * *

Case in Each Department Shows Work to Be Done on Parts

Each part is blackened and the surfaces to be processed are buffed to show where the work of the department applies. This together with blue prints avoids duplication of effort.—Page 1518.

* * *

Annealing Eliminates Residual Magnetism

Relay cores for telephone switchboards are packed in steel boxes, which are put in air-tight annealing pots, sealed with fireclay. Six hours at 1525 deg. F., draws the magnetism. —Page 1520.

Dies for Brass Die Castings Must Withstand Severe Service

Continuous expanding and contracting breaks down the structure of the steel. Problem of making brass die castings commercially was solved by handling the metal at lowest possible temperature and removing the casting from the die as quickly as possible.—Page 1522.

* * *

How the Small Plant Can Fight Big Plant Competition

Avoid self-satisfaction. Don't sneer at budgeting, detailed cost keeping, association memberships, and management engineering as non-essential frills. Put a question mark after every new process or idea and determine whether it is applicable.—Page 1500.

* * *

Cutting Carriage with 14 Tools Bevels Plate Edges

Each tool trimming plates to be formed into pipe takes a cut of about 0.003 in. deeper than the preceding one. Thus the chips are of moderate size. The operator rides on the carriage with the tools.—Page 1504.

* * *

Chips Removed by Special Crew

Anti-friction bearing maker has three men separate the work from the chips and fork the chips into chip boxes, which are carried by a two-wheeled carryall to the chip wringer. —Page 1508.

* * *

Flat Springs Formed at Rate of 34,000 an Hour

Hand-fed press produced 1500 to 1800 per hr. High production machine takes a chute of blanks and feeds them directly into the forming rolls.—Page 1519.

* * *

Saves Machining Cost with Brass Die Castings

White metal die castings deteriorated in soap dispenser application. Brass forgings proved too costly, due to excessive machining necessary. Brass die casting proved satisfactory and economical.—Page 1523.

* * *

Economically Low Inventory Carried with Safety

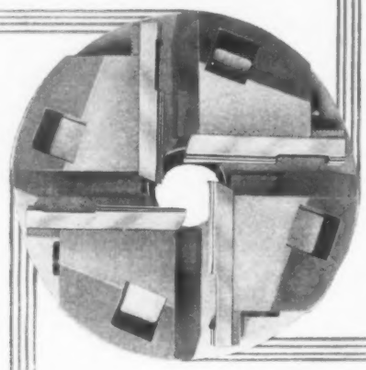
Manufacturing schedules for office appliance parts are based on sales forecast. Order control sheet is arranged in sections, according to the uses of the various parts. It also shows quantity of parts in stock, process of manufacture, sub-assemblies, process assembly and total at a given time.—Page 1512.

NEXT WEEK

AN expanding use of steel is shown in the equipment now more and more used by building contractors. A business has developed out of having in store more or less standardized scaffolding of metal that may be quickly erected and used over and over again. The demand is a response to the desire to reduce the amount of inflammable material at a building in process of construction and to provide devices to protect life and property. Next issue will supply an interesting study of the subject.

THE J&L TANGENT DIE

for value received



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The rapidly growing acceptance of the J&L Tangent Die, recently announced by Jones & Lamson Machine Co., is gratifying proof that this tool is meeting the demands for economy which are claimed for it.

For accuracy in high production, for long wear, for economy on a basis of the cost per screw, *for value received,* the J&L Tangent Die is a tool which commends itself to all shops producing quality screw threads.

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..THE IRON AGE..

New York, May 7, 1931

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VOL. 127, No. 19

HAS THE SMALL PLANT A FUTURE?

By BURNHAM FINNEY
Detroit Editor, The Iron Age

VIEWING the continued trend toward the merger of already large companies into still larger corporations, the casual observer perhaps thinks that individual enterprise is rapidly being crushed. The chain stores seem to be gaining at the expense of the independent merchant, chain banks are forging to the front in the financial world and in the manufacturing field the small plant faces the competition of a General Electric, a General Motors or a Standard Oil.

In automobiles, General Motors and Ford are supplying 75 per cent of the market. In electric refrigeration five or six companies make 90 to 95 per cent of the total output. One might recite the situation in various other industries, repeating the same story with monotonous regularity. Then you may well ask, "Is there no hope for the small manufacturer? Is American industry to become entirely an impersonal sort of thing, from which has been eliminated the individual initiative and enterprise found frequently in the small plant owner?"

Surprising as it may seem, the answer is to be discovered in a message of hope and encouragement for the small plant operator. Briefly, this message is that the small company which is intelligently managed, which joins in trade association endeavors with its larger competitors, which knows its costs and therefore sells its product at a profit, which concentrates its energies and resources on building a quality article, will continue to have a place of its own in the industrial picture.

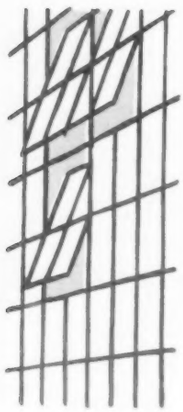
As a matter of fact, the consolidation of four or five companies into a young giant is not akin to rubbing Aladdin's lamp and thereby gaining immediately higher earnings, greater efficiency and the other attributes of a successful business. Mergers in themselves create new problems. Writing in the Executives Service Bulletin of the Metropolitan Life Insurance Co., H. W. Phelps, president, American Can Co., recently observed:

"A merger is little more than an opportunity for an able management to do a good piece of work.

▲▲▲

THE numerous successful small plants in the metal-working industries belie the somewhat general belief that they are being supplanted by large corporations through mergers and consolidations. They are successful because they are well-managed, know their costs and price their products accordingly, have modern equipment, pay special attention to quality and supply a personal service to customers which is beyond the reach of their huge competitors.

However, there are pitfalls to be avoided. The small plant owner cannot afford to sit in a corner by himself and refuse to participate in trade association activities. He should not look upon what the large corporation does as merely frills and fads, but should put a question mark after every new process or idea, investigating its applicability to his own business. Self-satisfaction, which tempts him to doze when he should be alert, is his greatest enemy.



Companies are brought together on the basis of earnings and assets. The picture looks bright, but when the merger actually is consummated, difficulties arise. These are at least four-fold, (1) the personnel, (2) methods of marketing, (3) manufacturing facilities, and (4) equipment."

Other difficulties besetting many large corporations might be cited—delayed action by committees rather than the quick, unhampered decisions of the small plant owner; substitution of salaried executives for men whose finances are at stake; tremendous overhead expenses which are virtually nil in the small shop, where the owner usually is the president, general manager, sales manager and production superintendent; and the comparative inflexibility which results from a necessarily complex arrangement.

Small Plants That Are Holding Their Own

Examination of the small plant's position in certain fields brings to light some interesting and cheering information. In the automobile industry the small, independent company has not and, according to testimony of men long familiar with the situation, will not be eliminated. In fact, executives of large companies admit that they would dislike to see all of the small makers disappear. The reason is that the latter are in a position to introduce new, possibly radical styles at a relatively low cost. They can determine the public's taste, while the large company stands by and watches. If the style takes with the motorist, the large builder follows the lead. It is significant, incidentally, that in every case the successful small automobile company makes a quality car. Naturally it could not compete with the mass production factory on a price basis.

Turn for a moment from automobiles to a branch of the machinery industry. Few lines have been worse hit by the depression. Yet one of the few bright spots in an otherwise dull picture is the performance of a one-man company. This was no freak of fortune, for the company has been a consistent money-maker in recent years. Its president molds its general policies, has a generous hand in designing its product, shoulders the brunt of the selling, personally supervises factory operations and still finds time to participate in association affairs. He makes a product nationally known for its quality. He knows his costs and prices his product to make a profit. His overhead expense is confined to two young women clerks, two draftsmen, a timekeeper and a shop foreman. And he has not neglected to keep his shop equipment modern.

For the small operator there is a challenging situation in the foundry trade. Introduction of new processes, substitution of other material for castings and the constant search of customers to find lower costs, have wrought havoc. Many firms have shut their doors as they gave up the battle to hold their positions. Seemingly, the trend still is toward fewer foundries.

However, many foundrymen believe that the well managed small foundry need not fear for its life. They point to the fact, for instance, that when automobile manufacturers want experimental work done, they do not turn to the production foundry, but to the small one equipped to do quality work. On such occasions they are willing to pay a premium to have a job done right. It is in this type of work that the small foundry will retain a distinct place for itself. In a limited way, also, it can go in for some of the processes used successfully by the larger units. This is particularly true of small foundries making small-sized castings, which in many cases lend themselves to mass production methods.

What a Small Tool Company Did

From the president of one of the most successful small tool companies in the country comes an interesting comment on the program which has enabled him to combat profitably the competition of firms many times larger:

"Too many small plant owners feel that large corporations indulge in non-essential frills. I emphatically disagree. For instance, we could easily have our books audited by an unknown accountant at a trivial cost, but instead we engaged a nationally-known firm of certified public accountants, believing that the fact that this firm does our auditing carries weight with our bankers and likewise gives us prestige. Moreover, we are not self-satisfied, as so many small shop executives seem to be. If large corporations can profitably expend money to improve their efficiency, small companies can do the same. Working on this principle, we recently invited a firm of management engineers to study our administrative, shop and selling methods and tell us our strength and weaknesses. This survey resulted in changes in our organization which already can be measured in sizable savings.

"We operate on a budget system the same as a large shop and know the cost of every job. We have a wage incentive plan which gives all employees an

opportunity to participate in profits. We maintain close contact with our customers. When they deal with us, they deal with the head of the firm, not with a subordinate. They feel, therefore, that they are getting the personal attention which cannot be secured in doing business with a large corporation.

I believe that the exceptional quality of our product is due to its manufacture by a small, closely-knit organization, each member of which is personally interested in its success. The workman's pay check doesn't come from someone known to him only by name, but from the man who is in daily contact with him out in the shop, making suggestions and giving him a word of encouragement. These touches which mean so much to the morale of an organization are conspicuously absent from a large corporation. Therefore, I am of the opinion that the small plant today has just as bright a future as at any time in its history."

This executive's shop, like other prosperous small companies today, has modern equipment and ideal working conditions for employees.

Successful Small Maker of Jigs

In a field where there is intense competition—manufacture of jigs, fixtures and other tool room equipment—is an outstandingly successful company. Asked to explain its ability to make money when many others were having trouble in making ends meet, the general manager told the story of how the shop had kept cost records from the day it went into business some 16 years ago, how its estimates on jobs in the last 10 years had missed actual costs by less than 0.5 per cent and how it had had the courage to refrain from cut-throat methods when it knew that its competitors were making bids at suicidal prices.

He said that his company started out with the conviction that tool makers are excellent workmen, but inferior salesmen. Capitalizing this idea, it has sold its services as an organization to its customers. That is, it is not content to take an order for a jig

or a tool, but stresses its cumulative experience in tool room practices over a period of years, sending its representatives into a customer's establishment as tool room experts the same as a firm of professional accountants would step in to study an accounting problem.

These are not isolated cases. They can be duplicated a hundred-fold, but the repetition of what virtually is the same story would soon grow tedious. The answer to the interrogation at the beginning of this article, "Has the small plant a future?" is found in the following observations:

First, the trend toward further consolidations has not halted, although business realizes better than it did a year ago that a merger is not in itself a Utopia. It is safe to say that future consolidations will depend more than ever before upon obvious advantages to be gained in lower production costs, elimination of duplication in selling effort and cutting down of administrative expenses. They will not be thrown together so hastily as in the past.

Second, the position of the small independent business seems to be improving. Last year there were fewer failures of independent retail stores than in the two previous years. A recent study of small manufacturing establishments in the metropolitan New York area revealed the surprising fact that the number has increased rather than decreased.

Third, the small plant's success is dependent primarily upon good management. It should not look upon what the large company does as mere frills or fads. When Chevrolet or National Cash Register adopts a new method, the small plant should not dismiss it without examination on the presumption that it cannot be adapted to its needs. It should put a question mark after every new process and investigate whether it is applicable to its business.

High Skill of Average Workman

Fourth, the small plant must watch its costs, must discard antiquated machinery in favor of modern equipment, must make sure that it is selling its product at a profit, must pay special attention to quality, and must supply that personal service to its cus-

(*Concluded on page* 1518)

NEW PIPE MILLS AT McKEESPORT WORKS OF

IN the development program of the United States Steel Corpn. many changes have been made in the McKeesport plants of the National Tube Company. An extensive construction program was approved early in 1929, and the work begun on June 18, 1929, was virtually completed at the close of 1930. It was on Dec. 29 when the first heat of open-hearth steel flowed from the new furnaces, thereby putting in operation the last of the new units on the program, which consisted of:

Replacing ten lapweld furnaces with two seamless pipe mills,
New mixers and new mixer building,
New Bessemer steel plant,
New open-hearth steel plant,
Conversion of slabbing mill into blooming mill,
Reconstruction of No. 1 blooming mill,
New 32-in. reversing bar mill,
One seamless mill with a range of 3½ in. to 8⅝ in. outside diameter, and one seamless mill with a range from 7 in. to 24 in. outside diameter—the large sizes being the new product of National Tube Co. rotary-rolled seamless pipe.

All of this work was done in the short space of 18 months, without interference with regular operations, and there was no appreciable loss of tonnage during the transition period.

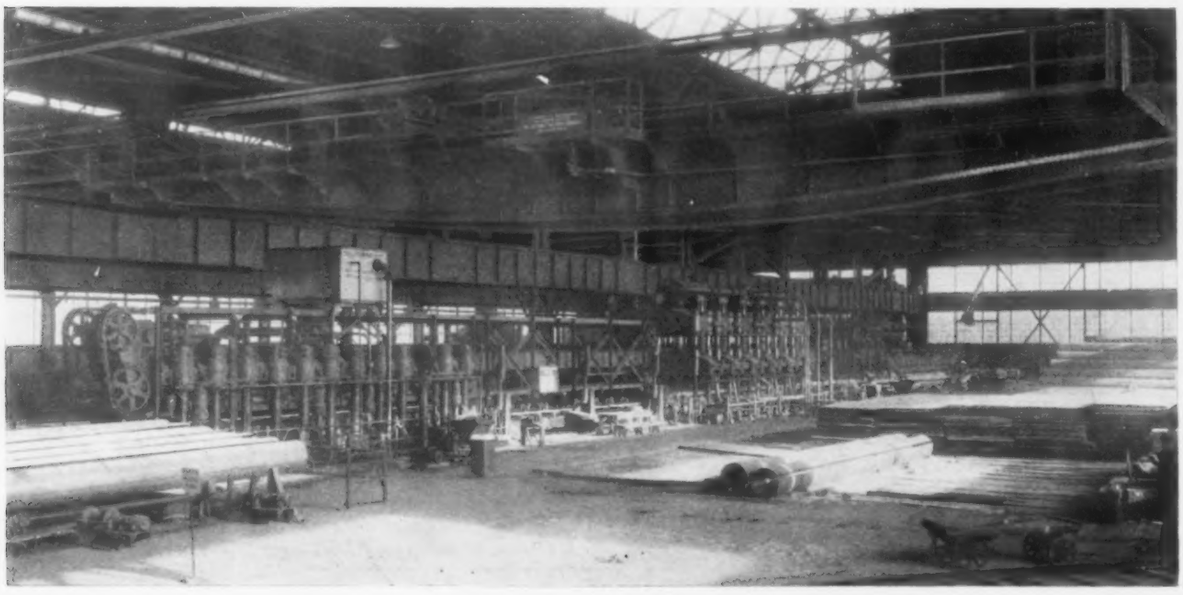
While most of the new equipment has gone into National works, the enlargement of Christy Park works in the same city formed an important and interesting part of the program. An entirely new department has been set up here for the manufacture of large-diameter electrically welded pipe, the production of which commenced July 22, 1930.

Welding is done on automatic machines—30 in number—after the blanks in the shape of plates have been processed far enough so that the welding completes the job. These machines make pipe from 14 in. to 30 in. in diameter, in 40-ft. lengths. Two additional machines, with range from 24 in. to 72 in. in diameter, in 30-ft. lengths, extend tne field into the largest sizes.

In this and succeeding articles will be treated the three main elements involved in the new equipment. One article will cover the steel-making process and the

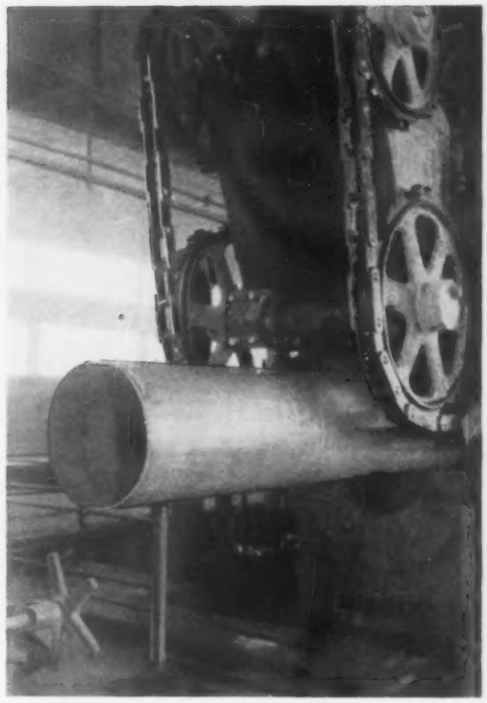
(At top, opposite page) Pipe leaving 10,000-ton hydraulic press, formed into circular cross-section with narrow gap at top, which is closed in next operation.

Pipe-forming department, with plate planer at extreme right. In middle distance (above the ends of two pipes lying in foreground) is the first hydraulic press, from which the blank comes in a somewhat distorted section. At left is the second hydraulic press, from which the blank emerges practically circular in form, as shown on next page, at top. ▲▲▲



By SIDNEY G. KOON
Associate Editor, THE IRON AGE, New York

NATIONAL TUBE CO.



DEMAND for large-diameter pipe for long-distance pipe lines has been so heavy that the new electrically welded pipe department of the National Tube Co. has been operating both day and night. This plant makes pipe from steel plates in lengths of about 40 ft., passing the pipe through in a virtually straight line from point of receipt of plates to the shipping platform. The electric welding operation itself is performed in a battery of 30 machines. Allowing for the time required to slip the pipe back from the machines and load another blank in, these machines have capacity for about four miles of pipe a day

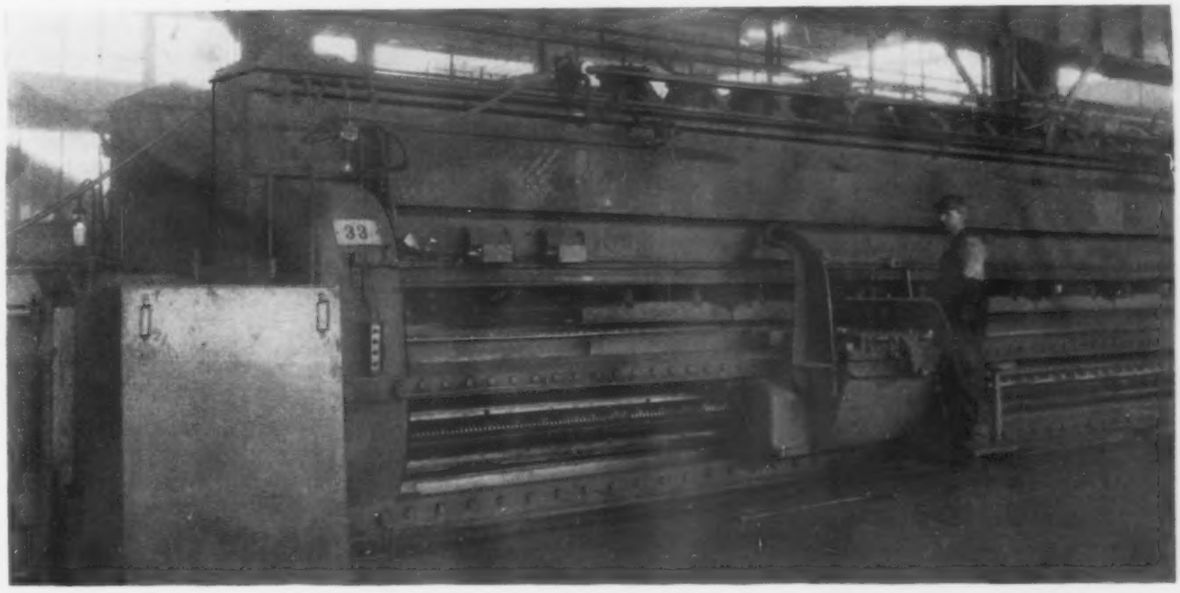
rolling of the rounds ready for the seamless mills. Another article will describe the two seamless mills. The present article is concerned with the electrically welded pipe equipment and operations.

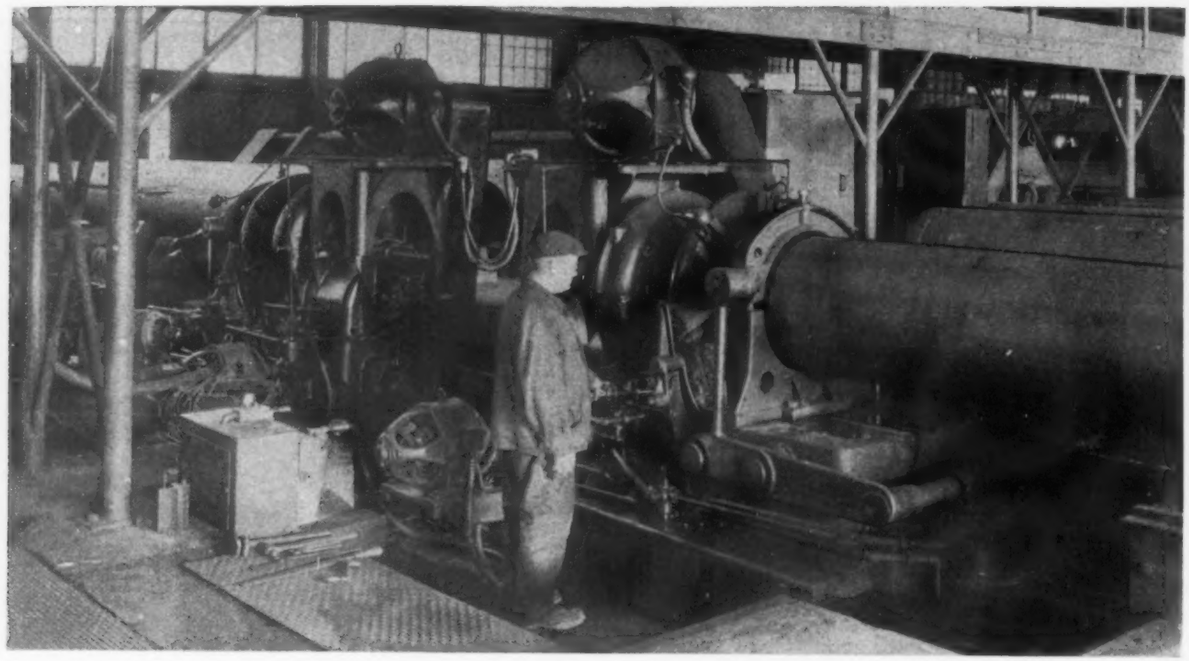
Electric Welding Plant at Christy Park

AN electric welding process in use by the National Tube Co. at the Christy Park works, in turning out electrically welded pipe from steel plate, is in an entirely new building. The processing equipment is arranged to carry the material on practically a straight line from entrance to exit. And, so far as possible, the entire operation is automatic. The layout is shown by diagram.

Briefly, the equipment includes straightening and flattening rolls for the plate as received, a cleaning device for the surface on one side, a planing and beveling machine for the edges, a series of two presses for forming the plate into the shape of a pipe, tack welders for holding the edges together, and a battery of 30 welding machines for the final welding

Plate planer in pipe-forming department (Below). The carriage on which operator is riding is actuated by the large lead screw, while the plate is held firmly by air clamps.





Finishing ends of pipe so that it may receive a coupling and make a tight joint. Both ends are machined at one set-up, before the pipe goes to the hydraulic testing outfit.

operation. After this point come the swing grinders and milling machines for preparing the ends of the pipe to receive couplings, testing equipment through which every length of pipe goes, and the coating and shipping of the material.

Plate stock is unloaded from incoming cars, at one end of the plant, by means of multiple magnets suspended from a yoke on the crane. These plates are placed upon the approach table to the straightening machine. As they move from the table into the machine, they pass between batteries of gas jets, above and below, for the purpose of removing moisture. Coming from the straightening machine the plate reaches a table from which it goes into the blast machine, where one surface is cleaned.

Tilting Plate for Cleaning

Heretofore the plate has been in a horizontal plane. It is now tilted up and enters the blast machine on an angle of about 45 deg. In this position it is blasted on the lower face by means of fine steel shot having a diameter of about 0.02 in. and thrown against it with great force. This operation takes off all scale and leaves the surface clean. At the same time the angle of impact is such that the shot drop off into a hopper and can be used over and over again.

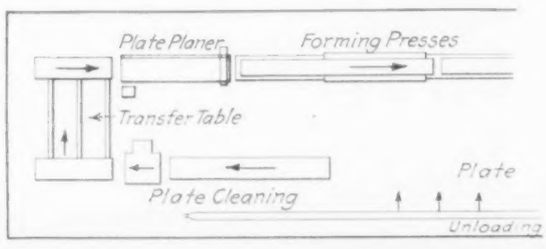
GENERAL layout of the electric-welded pipe department. Incoming pipe, unloaded near left end, follows the arrows generally toward the right to the shipping point. Several digressions are made from the straight line, notably for the automatic welding machines, for inspection and for the finishing processes on the pipe ends.

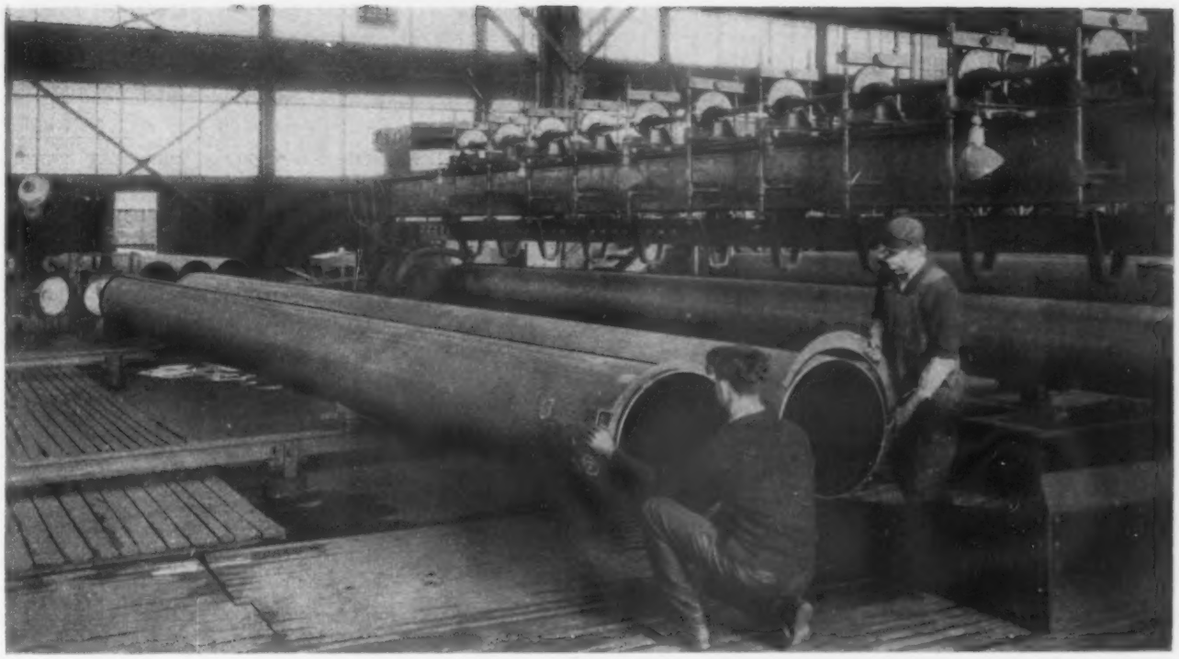
Plate Is Beveled on Lower Edges

PASSING from the blast machine, the plate is again lowered to a horizontal plane, shifted sideways on a table, and passes into the planing or edge-trimming machine. Here both edges are beveled simultaneously while the plate is held stationary, and the two cutting carriages move along its edges. Air-operated clamps hold the plate rigidly in position. The bevel is taken off on the lower side of the plate rather than the upper, so that it is unnecessary to turn the plate over afterward.

Each cutting carriage has 14 tools so set that each succeeding tool takes a cut about 0.003 in. deeper than the preceding one. In this way the chips taken off are of moderate size and the whole functioning is very smooth. The carriages with their cutting tools are traversed the length of the plate by means of large lead screws in the base of the machine. The operator rides on the carriage with the tools and has easy control through push buttons.

Continuing along the same line of travel, the beveled and accurately sized plate now reaches the first hydraulic forming press. This has a double action, first giving the plate a crimping effect near the edges, and then with the center ram forming it into





▲▲▲ Pipe-testing department, showing hydrostatic testing machine in background at right and inspection table at left. Powerful lights at the far end permit careful inspection of interior of pipe.

the preliminary round section. This press exerts a total force of 750 tons.

A second hydraulic press, of 10,000 tons capacity, takes the blank from the first press and forms it into practically the final circular shape. It leaves this press with the two beveled edges (on 24-in. pipe, for instance) about 1½ in. apart.

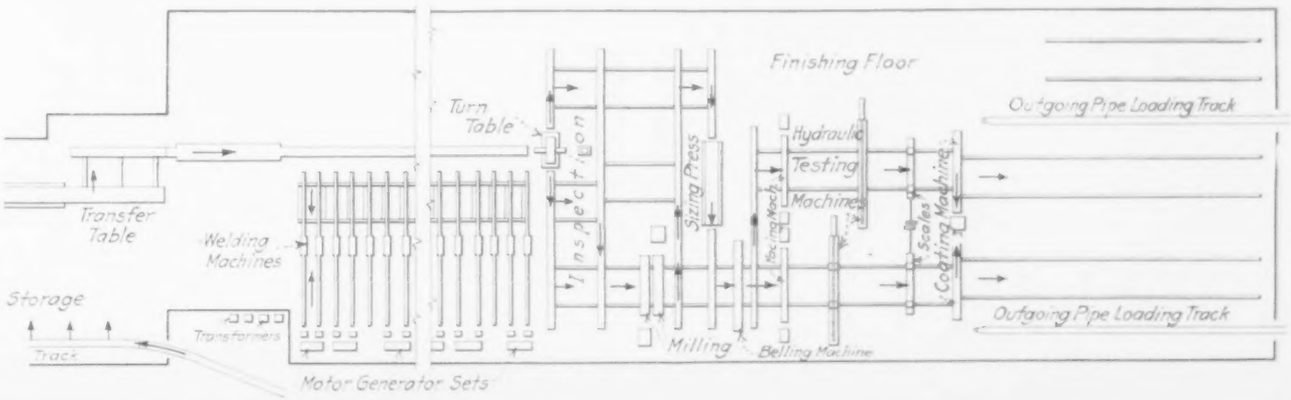
From the second press the form passes to a series of tackwelders, in which the two edges are pressed into contact by means of clamps actuated by air cylinders. Then a tack weld, every 2 ft. roughly, is applied, to hold the edges together. This welding is done with current of about 250 amperes. It is merely a means to maintain the shape and edge contact of the embryo pipe until it can be finally welded and completed. Its effects are completely masked by the subsequent automatic welding at much higher current density.

Leaving the tack-welder, it is necessary to turn the tube through 90 deg. in passing it through the welding machinery. There are 30 of these automatic machines in a long row parallel to the line of progress which the material has been making up to this point. But, in the interest of saving length in the building, the welding operation takes place at right angles to the original direction of movement of the pipe in process. Therefore, the pipe is picked up by means of double tongs depending from the crane, is turned through 90 deg., and is deposited on the approach table to one of the welding machines.

Automatic Welding at Predetermined Rate

THESE machines use current of about 600 amperes and 32 volts. Each welding machine has its own generator, and each of the 15 motors actuates two generators. The battery of 15 motor-generator sets is placed in close proximity to the (outdoor) transformers through which the incoming high-voltage current is passed.

When the pipe enters the machine it passes under a boot depending from an overhead hopper, in which a special flux has been placed. This flux is deposited



upon the seam in a ridge perhaps ¾ in. high and 1½ in. wide. A few inches ahead of the boot is the welding wire. The line to be welded has the familiar V-section, from the bevel cuts made on the plate in the edge planer.

Welding takes place under the cover of the layer of flux, a development brought out by the National Tube Co. Consequently not only is the surface (at the high temperature it reaches) protected from the air and consequent oxidation, but also, through the presence of the insulating layer of flux, the weld metal becomes annealed in traversing the next few inches of its progress. A suction device about a foot beyond the point of welding draws off the remnants of the flux which has thus been used, passes it through a multiple collector pipe, and discharges it outside.

Welding wire made by the American Steel & Wire Co. is of steel, 3/16 in. in diameter, and the weld metal itself consists largely of the combination of this wire and what is obtained from the flux. Certain ingredients in the flux are employed because of their great affinity for oxygen. This further insures that the newly welded area will not become oxidized through the action and the heat to which it is subjected.

Welding takes place at a steady and uniform rate. It is a continuous operation, and results in completing a 40-ft. length of pipe in one movement. The pipe is grounded by connecting it to the generator furnishing the current, thus completing the circuit. Cooling water keeps the backing up strip and the horn itself from getting too hot and burning away. The carriage on which the pipe rests during the welding process is moved forward by a screw feed at a predetermined rate, varying somewhat with conditions.

To leave the welder, the pipe is run back over its course, and thus slid off the horn, which does not have to be moved. Rigid inspection follows the welding.

As first formed, the pipe is somewhat oversize. Thus, a 24-in. pipe will be about 24¼ in. in diameter. It is passed then through a 10,000-ton hydraulic sizing press, which contracts it enough to take off the excess diameter, and gives it the final circular section, for as it comes from the welder it is slightly elliptical. This straightening and forming operation is thus the means of producing pipe which is both straight and of exact diameter.

General view of electric welding department. The welding machines are under the crane girder at right. Pipe approaches on the runways in left foreground. Each piece is picked up by the crane and turned 90 deg. to feed into the welding machine.

Completing the Product for Shipment

FINISHING the pipe includes several processes, as with other types of pipe. One thing done here, however, which does not have to be done with fire weld or seamless pipe, consists in taking off the excess weld material for about 8 in. at each end of the pipe, so that it may take a pipe coupling. Over all the rest of the length the weld metal stands out above the outside diameter of the pipe in a uniform ridge perhaps 1/16 in. high, and there is also a ridge of similar character, but smaller, on the inside of the pipe. These customarily are not removed, as they are no detriment to the pipe in service.

Facing and beveling the ends of the finished pipe are performed on a number of machines, each having an operating unit at each end. Both ends are treated simultaneously. After the facing and beveling, all pipes are run through a testing machine, of which

there are two in use, designed to furnish from 600 to 2500 lb. pressure of water. While under pressure, the pipe is subjected to hammering from a set of ten hammers each striking a definite blow, all in the interest of determining that the pipe is suited to stand up under its destined work.

Pipe having gone through all this process, and being passed for shipment, is given a primer coating of protective material, to serve for transportation purposes only. This is much thinner than the coating which it will receive in the field, if it is to be line pipe, preparatory to its being buried in the earth. It does, however, protect the surface while the pipe is on the way to its destination.

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Resistance of Aluminum Steels and Aluminum-Coated Steel to Oxidation at High Temperature

IN an investigation of aluminum coatings on iron, A. Hauttmann (*Stahl und Eisen*, Jan. 15, 1931) has studied the resistance of a series of iron-aluminum alloys to atmospheric oxidation at 1830 deg. F. Alloys were prepared from Armco iron and 50 to 60 per cent ferroaluminum produced by fusing 98 to 99 per cent aluminum with Armco iron, using pure refractories so as to maintain the purity of the ingredients. The rate of oxidation in air in an electrically heated furnace at 1830 deg. as determined by the increase in weight of cylindrical test pieces (during a 48-hr. test) is indicated in the following table:

Resistance of Aluminum Steels to Oxidation

Sample No.	Aluminum, Per Cent	Oxygen Combined, Grams per Sq. Meter per Hr.	Density, Grams per Cc.	
			Observed	Rule of Mixture
1	0.00	45.7	7.85	7.85
2	1.84	36.2	7.68	...
3	3.72	31.5	7.37	7.35
4	9.44	0.57	6.92	6.65
5	22.34	0.29	6.05	5.52
6	38.32	0.14	5.75	...

Samples No. 2 to 5 lie in the field of solid solution in the Fe-Al system, while sample No. 6 is in a two-phase field. The remarkable increase in resistance to oxidation in the range 4 to 9 per cent aluminum recalls the influence of solid solutions on the resistance of alloys to attacks by acids. The reason for the stability of the metal at high temperature is apparent in the amount and color of the scale developed. The first three test pieces were covered with a thick layer of gray-black scale consisting of a mixture of iron oxides. Samples Nos. 4 to 6 developed a fine scale, reddish white to white in color, composed chiefly of aluminum oxide. In the latter steels, the aluminum apparently reduces the iron oxides formed in the early period of the test, and the alumina thus formed affords protection similar to that of the oxide layer on metallic aluminum at ordinary temperature. The nature of the solid solutions is such that, below a certain concentration of aluminum, the protective action is much less marked.

Thus, up to 4 per cent aluminum the density of the alloys follows the law of mixtures, but at higher concentrations the density found exceeds the calculated value. Naturally in the latter range of diminished volume the aluminum atoms are able to give better protection. The strength of the solid solution alloys is such as to justify the name "aluminum steel." In the air cooled samples Nos. 2 to 5, the difficulty of machining increased with the aluminum content, so that No. 5 was ground to shape instead of being turned.

Tests were also made on cylinders of Armco iron, coated either by hot dipping in baths of 98 to 99 per cent pure aluminum, which gave brittle coatings owing to the compound Al_2Fe, or aluminum was absorbed by diffusion by heating the specimens in powdered 52 to 59 per cent ferroaluminum. In the latter process the increase in diameter of the test pieces and the depth of the diffusion layer were found to increase rapidly for the first ten hours and then more gradually, the relation to time being parabolic. The rate of absorption also increased as the temperature was increased from 1600 to 1830 deg. From the work on the homogeneous tests, one would expect a coating to offer protection until the diffusion of aluminum lowers the concentration in the outer layer below the critical amount. However, cracks are apt to form which will admit oxygen prematurely to layers deficient in aluminum. Cracking is probably caused by variation in the coefficients of expansion of layers with different aluminum contents. The resistance to oxidation increased with thickness of coating, and the coatings made by the diffusion process were found to be superior to the hot dipped, especially when prepared in the 59 per cent alloy.

While the diffusion process can be applied to complicated shapes without difficulty, the hot dip can compete on a cost basis for simpler work. Frequent and abrupt changes of temperature are sources of danger to the protection, especially for the dipped coatings.

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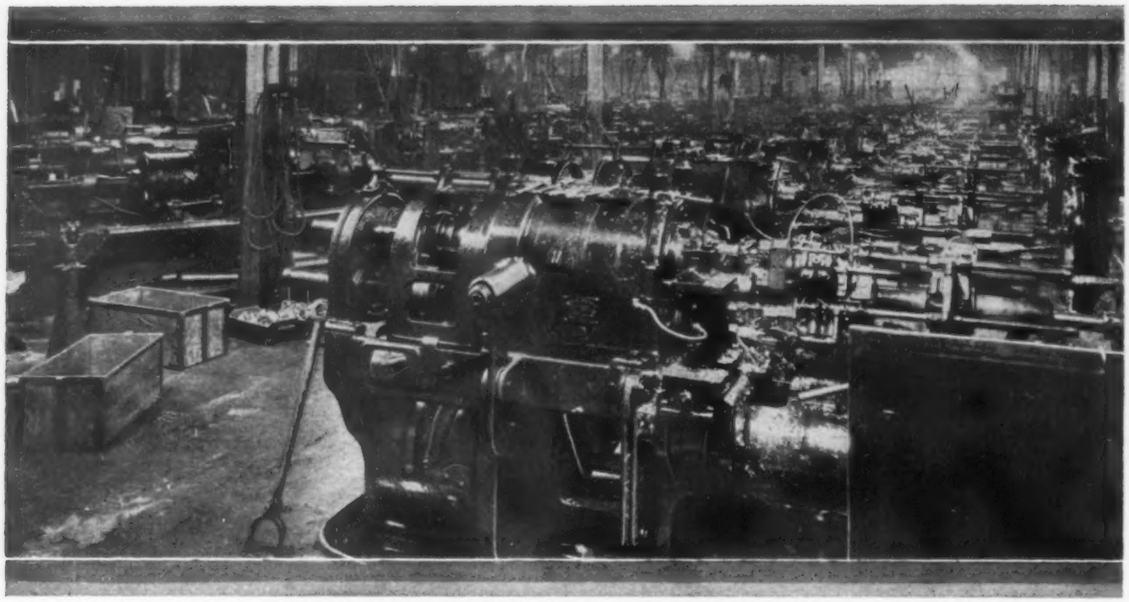
THE Wrought Iron Research Association, Union Bank Building, Pittsburgh, in a pamphlet of 50 pages, entitled, "Wrought Iron, Its Characteristics and Applications," gives methods of defining the puddle ball, deals with double refined iron, shows photomicrographs and many other illustrations of iron of varying compositions and methods of working, and tells of the weldability of iron and something of the possibilities of cold working. Considerable information is given on the resistance of wrought iron to the effects of vibration, torsion and shock and there are several pages on protective coatings. Uses of wrought iron for a wide variety of purposes are enumerated in some detail.



SCRAP HANDLED AND CUTTING OIL RECOVERED ECONOMICALLY

By E. S. WOLSTON, PLANT ENGINEER
SKF Ball & Roller Bearing Co.,
Hartford, Conn.

EFFICIENT handling of product, both as work in process and as finished stock, naturally requires the lion's share of a plant manager's attention. But many collateral problems confront the factory executive; one of them, chiefly the concern of the maintenance and plant engineer, is the efficient handling and disposal of so-called by-products.

In a plant engaged in the manufacture of anti-friction bearings, steel turnings are one of the largest of the by-products, and in addition to proper handling and disposal, this scrap presents a problem as regards the reclamation of the cutting oil.

At our plant the handling of steel turnings and the reclaiming of the oil are performed by a service department, supervised by the plant engineer. The work embraces the following objectives:

1. *To keep all machines serviced free from large accumulations of turnings, which are not only unhandy for the operators but also dangerous and unsightly.*
2. *To separate the work from the turnings.*
3. *To extract from the turnings the maximum amount of oil.*
4. *To return the reclaimed oil to the machines in a clean and sanitary condition.*
5. *Finally, to prepare the turnings so that they may be easily loaded on cars at our railroad siding and so that they will be in a form that will command the maximum selling price.*

Six productive and one non-productive department, namely, the toolroom, are serviced. These departments contain more than 100 machines, including bar turning lathes, single and multiple-spindle automatic screw machines, sphering and chamfering lathes, turret lathes, and the lathes, millers, shapers, etc., used in the toolroom and on cast-iron housing work. Although turnings and chips are removed regularly from all of these machines, recovery of cutting oil is confined largely to the turnings from the automatic screw machine departments, in which there are at present 24 multiple-spindle and 19 single-spindle machines. The chip room containing the chip crushing and oil reclaiming equipment is located centrally with respect to the departments serviced.

Six men are employed continuously in the service crew. Three of them service the machine tools; two, located in the chip room, take care of the oil recovery

and chip crushing operations; and one is assigned to the centrifuging, heating and pumping of the reclaimed oil. The sixth man is used also for wheeling chips from the shop into the chip room. The same crew handles chips from all machining departments. No manual handling is required after the crushing operation, the crushed chips being conveyed and deposited automatically in an overhead storage hopper, from which they are loaded at intervals directly into railroad cars.

The first step in the servicing work is forking the chips from the beds of the machines and placing them in chip boxes. In normal times, for the 43 automatic screw machines, a force of three men is employed continuously at this work, as previously stated, and the machines are cleaned once a day.

After the turnings are placed in the chip boxes, the work, consisting of ball and roller bearing rings, is removed by hand and placed in the regular tote boxes by sizes and lots. Several mechanical methods for separating the work and the chips have been tried out, but so far with little success. Mechanical separation is difficult because of the tenacious character of the chrome steel chips, which have a tendency to mat and inclose the rings.

The chip boxes employed were adopted after experimenting with various types. The bottom and sides of these boxes, which are 36 in. long, 18 in. wide and 16 in. high, are made of No. 14 gage black sheet steel, and all seams are welded. They have three strap-iron runners on the bottom. The ends of the middle runner are extended to the top of the box and terminate in eyes for receiving the hooks on the carryall used to transport the boxes of chips. A lower eye receives the hooks of the lifting beam, enabling the operator to dump the chips into the chip wringer basket.

The two-wheel carryall is used to pick up the loaded chip boxes after the rings have been removed, the boxes being wheeled across the driveway to the chip and oil reclamation department, which is conveniently located adjacent to the railroad siding. In the chip room the boxes are arranged in a definite order awaiting the next step in the process, which is the separation of the oil from the chips.

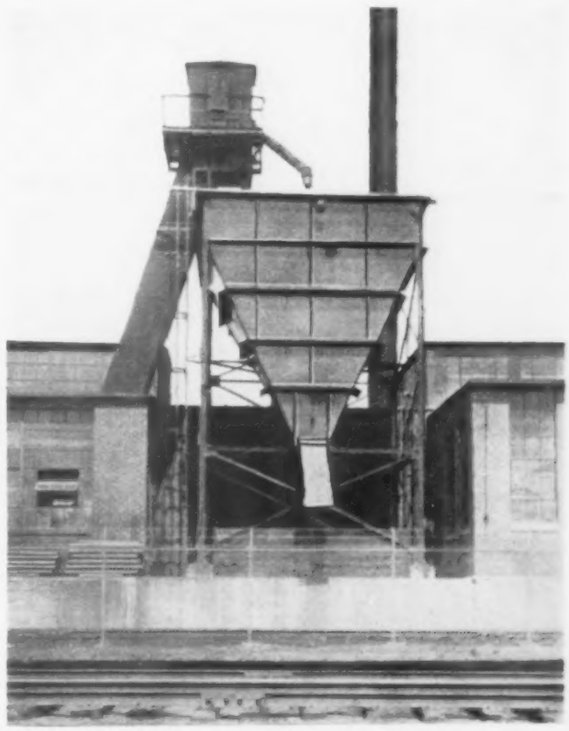
Oil Recovered by Centrifugal Extractor

For this operation a Tolhurst 48-in. center-slung chip wringer, now manufactured under the control of the DeLaval Separator Co., New York, is employed. The chip basket of this machine holds 11½ bushels, which is two or three times the capacity of the chip boxes employed. Two of these baskets are provided, one being loaded while the other is in the machine. There is a circular drip pan on which the basket that is being filled with chips is placed; in collecting the oil that drips from the chips, this pan serves to prevent waste and to keep the floor clean. The baskets are placed in and removed from the machine by an electric hoist suspended on the I-beam rail connecting the basket loading point, the chip wringer and the crusher.

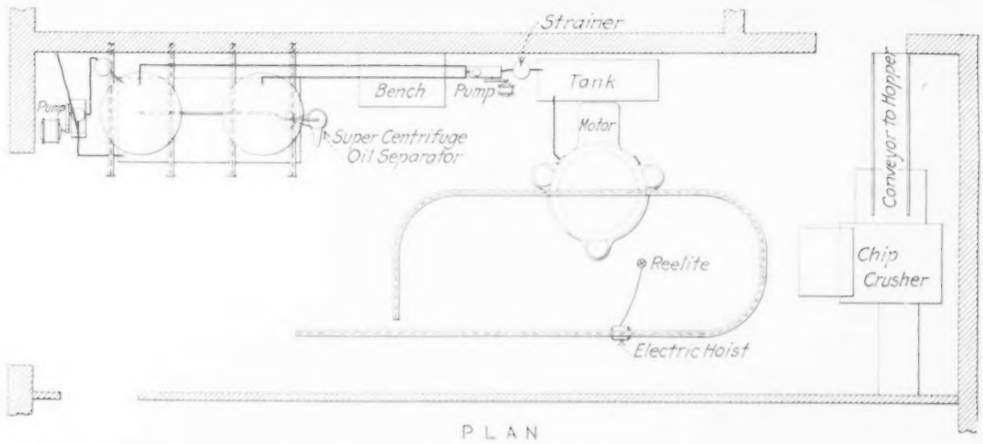
The chip wringer itself is mounted directly on the floor and is driven by 7½-hp. motor through Texrope belting and grooved pulleys. It is equipped with quick-acting hand-type brakes and a clutch pulley, which permits use of a standard, stock, squirrel-cage induction driving motor with push-button magnetic switch control. The brakes are interlocked with the electric circuit. As stated in the maker's catalog, the chip wringer is designed to speed up the handling of

"WE couldn't afford not to do it," was the comment of J. W. MacMorris, factory manager of the SKF Ball & Roller Bearing Co., Hartford, Conn., in discussing with visiting engineers the scrap handling and oil reclaiming system outlined in this article.

This remark means more, however, than direct profit on investment. In addition to the lower handling costs, reduced carloading expense, and other savings, the equipment installed, particularly the chip storage hopper and its conveyor, has brought definite returns in better plant housekeeping, with all that means in cleanliness and safety.



Dry crushed chips are elevated into the 78-ton capacity storage hopper by means of a bucket conveyor. Cars on the railroad siding are loaded by gravity through the hinged steel chute.



PLAN

material being centrifuged, thereby lowering the cost of recovering the oil, and to permit recovery of the maximum amount of oil, thereby lowering the total expense for oil.

During normal operation of the plant our chip production runs to 22 loadings of the wringer basket, a total of 253 bushels or 315 cu. ft. of chips.

Chips Crushed Before Storing

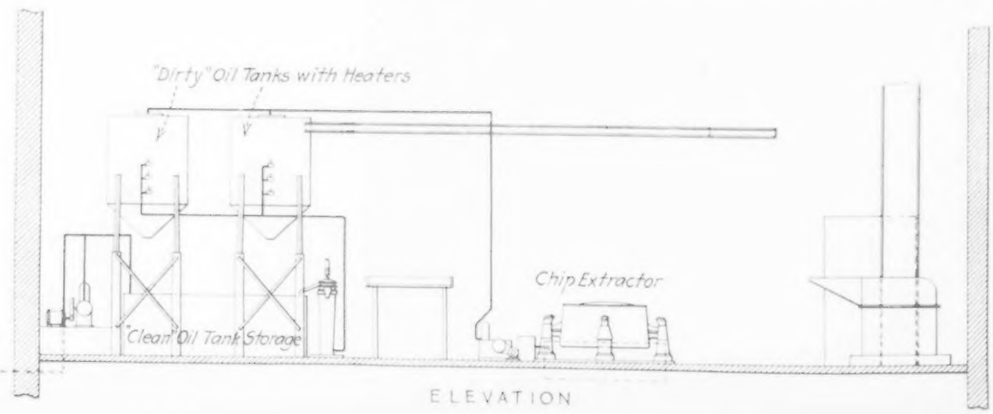
From the chip wringer the baskets of dry chips are carried by the overhead hoist and dumped into the hopper of the chip crusher. This machine, made by the American Pulverizer Co., St. Louis, is mounted over a concrete pit that is 9 ft. long, 6½ ft. deep and 3½ ft. wide. It is of the ring type; notched rings having a loose fit on a revolving spider are thrown out by centrifugal force, crushing the chips against the inside of the machine. The spider and shaft are mounted in spherical roller bearings set in steel housings.

The crusher is direct connected through a Brown "Protector Pin" flexible coupling to a 25-hp. constant-speed induction motor. A heavy flywheel on the opposite end of the shaft tends to equalize the speed of the machine and carry it over a peak load when chips are fed too rapidly into the hopper. Weighted hinged gates that may be opened by hand if necessary throw out solid pieces of metal to the side of the machine, preventing damage to the rings and plates inside the hopper. The 6½-ft. depth of pit over which the crusher is mounted is necessary so that the bottom of the chip crusher may be at floor level and yet permit the discharge of the chips to buckets above the lower sprocket shaft of the elevating conveyor.

Crushed chips dropping from lower part of crusher fall into a steel chute from which they pass to a continuous bucket elevator. This elevator is operated by a malleable link belt and delivers the chips to an elevated steel storage hopper that has a capacity of 3000 cu. ft. or 78 tons, the equivalent of more than two carloads of chips. Cars on the siding are loaded by gravity through the hinged steel chute which is lowered when the car is in position. A counterweight and latch arrangement serves to hold the chute in place while loading and to hold it against the side of the hopper when not in use.

This steel storage hopper, as well as the elevating conveyor, was built by the Jeffrey Mfg. Co., Columbus, Ohio. The four angle-iron supporting legs were designed for a load of 33 tons each with concrete step footings to reduce the load on the sub-soil to less than 1 ton per sq. ft.

The bucket elevator has a capacity of 100 cu. ft., or 3 tons, of crushed chips per hour, which is greater than our present requirements. It is driven by means of a 3-hp., 600-r.p.m. constant-speed squirrel-cage induction motor which drives a countershaft through V-belts. The motor is housed at the top of the elevator and is reached from the outside by iron ladders. The part of the elevator housing and frame extending above the roof of the chip building is protected by corrugated galvanized iron sheets which are flashed to the roof. The head shaft and the countershaft are supported in ball-bearing split pillow blocks. Because



ELEVATION

of the take-up feature, the foot shaft is set in plain bearings.

Reclaimed Oil Cleaned and Returned to Machines

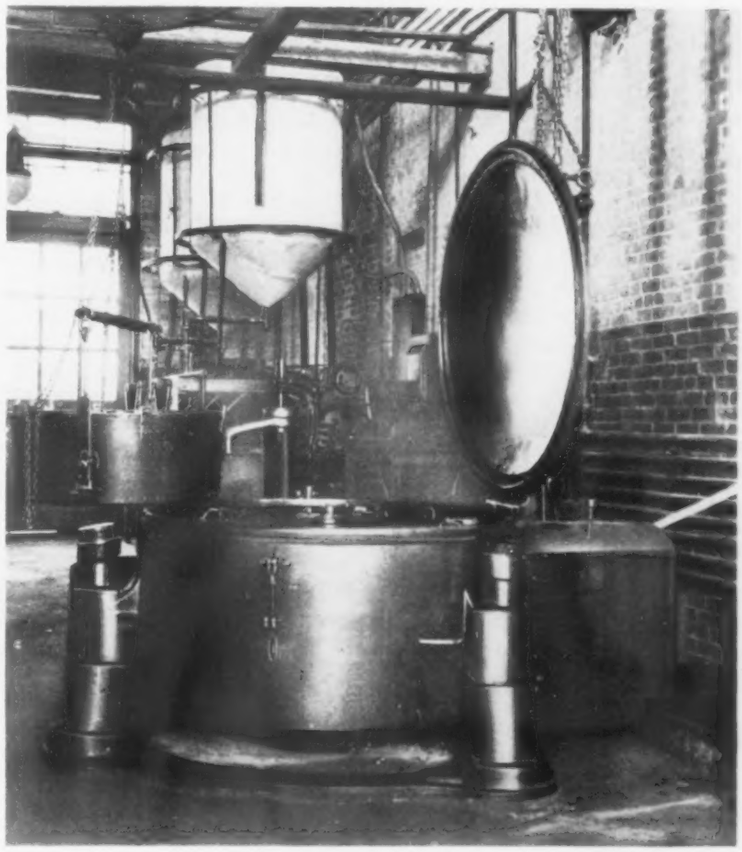
HAVING outlined the flow of scrap, from the machine tools to the railroad cars, and the personnel and equipment employed in this service activity, it remains to mention the operations and equipment connected with reclaiming the cutting oil recovered from the scrap. Then, a brief exposition of the advantages accruing from the entire scrap handling installation might prove of interest.

Oil recovered by the chip wringer flows by gravity to a small intermediate storage tank from which it is pumped through a strainer to cylindrical "dirty-oil" storage tanks mounted over the rectangular "clean-oil" tank. The dirty-oil tanks, two of them, have a capacity of 400 gal. each. Each is heated by 40 Westinghouse 1250-watt space heaters, a total of 50 kw. per tank, which are strapped to the outside. In addition, each tank is equipped with a compressed air line for the purpose of agitating the oil and to aid in the circulation. Manholes, gage glasses and thermometers are provided, and the tanks are insulated with 1-in. magnesium blocks over which is spread a plastic insulation with canvas cover.

Our present practice calls for filling the dirty-oil storage tanks, heating the oil to 160 deg. Fahr., and holding it at that temperature for about 45 min. This pasteurizing of the oil is intended, of course, to eliminate cutting-oil infection of the hands and arms of the men at the machines.

From the dirty-oil tanks, the oil flows by gravity to the inlet of a Sharples No. 6 Super Centrifuge which removes the fine chips and sludge that have passed through the strainer previously mentioned. This sludge collects on the inside of the bowl, which is cleaned once a day. The vertical spindle and bowl of the Sharples machine is driven by belt from a 2-hp. 3600-r.p.m. motor and runs at 18,000 r.p.m. At present we are centrifuging 600 gal., or 1½ tanks of oil a day. The time consumed in centrifuging one tank, or 400 gal., is only 45 min.

Clean oil from the centrifuge flows directly into the rectangular clean oil tank from which it is returned at intervals to the automatic screw machines by means of a motor-driven reciprocating pump.



Boxes of chips are wheeled across the driveway to the chip and oil reclamation department shown in plan and elevation on the opposite page. The central location of this department as regards both the main department serviced and the chip storage hopper at the railroad siding shortens the distance traveled in carting the chips.

Oil from the chip wringer flows to an intermediate tank and is pumped to the overhead dirty-oil tanks; it is then centrifuged and stored in the clean-oil tank located under the overhead tanks as shown in the elevation view. At intervals the clean oil is pumped back to the machine tools.

The chip baskets used in the chip wringer, shown at the right, hold 11½ bushels; from the wringer the dry chips pass to the chip crusher, are crushed, and elevated automatically into the storage hopper.

Present Scrap Handling System Proves Economical

Not only in direct expense reduction, but in release of floor space, better plant housekeeping and in other particulars has the scrap-handling oil-reclaiming system outlined above proved to be a good investment.

In the twelve-month period ended Dec. 1, 1929, our service department handled and crushed 1842 gross tons of steel turnings, the sale of which brought $11,890. Although in the past year the market price of crushed turnings has been little greater than that

(*Concluded on page* 1518)

PRODUCTION CONTROL OF INTERCHANGEABLE PARTS

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MANUFACTURE of office appliance machines involves a multiplicity of small parts. When to this fact is added the further fact that 219 different machines are made by an Eastern manufacturer, something of the complexity of production control in this plant may be realized.

The largest of these machines has about 11,500 parts, of which perhaps 2000 may be different items. The total number of different parts in the entire line of machines runs about 7000. About 1100 of the different parts can be manufactured in economic lots, because of the fact that they are designed to go into all or most of the machines.

Production control under these conditions is faced with the problem of having enough parts on hand of every description so that machines may be built as fast as orders call for them. Account must be taken of the highly fluctuating character of orders for certain machines, whereby demand in one half-year may be cut to only a fraction in the next half-year or, on the other hand, may be doubled or more.

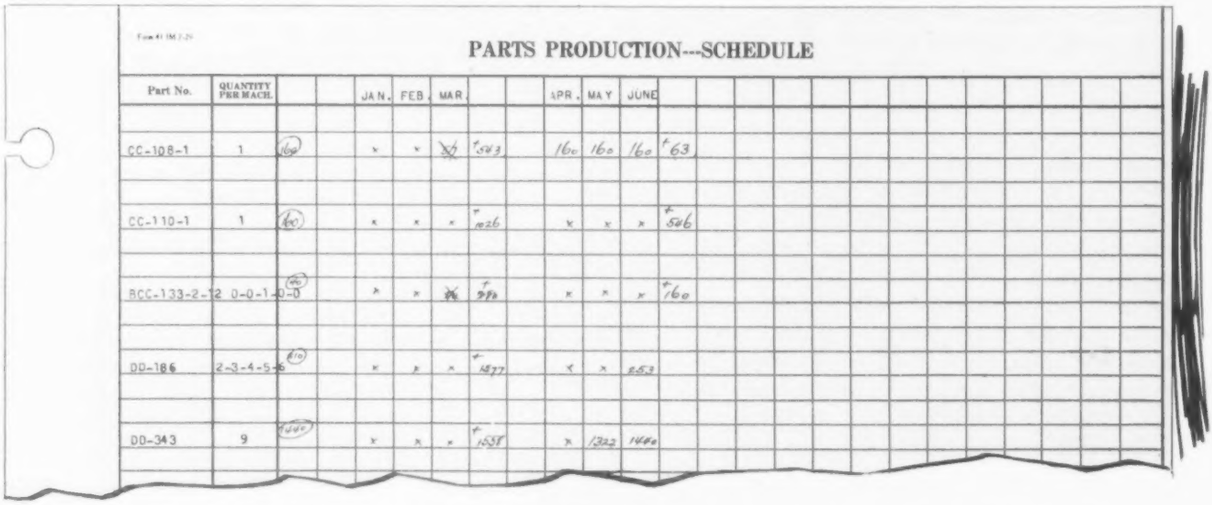
At the same time the necessity to avoid tying up excessive funds in inventory must be met. The problem then is to maintain a working balance between a large inventory, which would surely fulfill every need reasonably to be expected in months to come, and, on the other hand, a stock of parts low enough so that they will not pile up beyond needs of the immediate future. Flexibility thus becomes the keynote.

How the Production Schedule Is Broken Down

BEFORE the work proceeds, request for authority to manufacture a certain number of machines of a given type and size is submitted to headquarters. At headquarters all of the work of the various factories is coordinated, and also here the development work on new machines is initiated. Consequently, submission of the proposed schedule will make sure that nothing is built which is likely to be superseded in the near future by a new model.

Schedules for manufacture then are made out, the order control being posted from a breakdown of the approved request. This breakdown goes to machine and section sizes, and the order control sheet is arranged in sections, according to the uses of the various parts. It also shows quantity of parts in stock, process of manufacture, sub-assemblies, process assembly and total at a given time. These totals are brought to a common height as determined by the breakdown of the authorization.

On the reverse side is kept a monthly record of this total, from which are deducted quantities of sections as called for on sales orders, the difference being the amount of sections available. Average sales are shown also, and a glance at the "available" and "average"



PARTS PRODUCTION---SCHEDULE

Part No.	QUANTITY PER MACH.			JAN.	FEB.	MAR.			APR.	MAY	JUNE	
CC-108-1	1	160		x	x	X	1543		160	160	160	163
CC-110-1	1	160		x	x	x	1026		x	x	x	526
BCC-133-2-12	0-0-1-0-0	50		x	x	X	970		x	x	x	160
DD-186	2-3-4-5-6	610		x	x	x	1427		x	x	252	
DD-343	9	1440		x	x	x	1655		x	1322	1440	

Form 41—Parts Production—Schedule. Tentative posting of items to be required, month by month.

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CONTROL of production is far from easy when a multiplicity of small parts is involved. How one successful company handles this problem is told here, not merely as a story of one company's operations, but mainly to suggest to others some methods which they may find worth emulating. A master operation sheet has been developed which specifies in detail every operation a part is to undergo. This ties in with the entire system of control, with all the "checks and double-checks," which have made this practice yield such good results. Close supervision of stocks of finished parts and of sub-assemblies, in the interest of avoiding heavy inventory tie-up while still assuring adequate supplies to carry manufacture forward, is a fundamental. And the whole has been found not only thoroughly workable, but sufficiently flexible to allow for constantly changing conditions of business.

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quickly shows how many months' supply of any given section is available for future sales orders. A further classification into four groups is made with relation to the time required for processing the separate parts. Those which take longest are, of course, put into production first and correspondingly for the other items.

A parts production schedule is made out, as shown in Form 41, in which the number of individual parts likely to be needed each month is posted tentatively. This schedule is charted month by month and balances are struck. As the work progresses this sheet is subject to revision, so that at all times it represents the working schedule for the parts needed. A factory production order (Form 40) is typed in duplicate for the various parts required, one copy going to the cost department, while one copy is kept in the production office.

Along with this factory production order come department orders—a separate one for each operation which is to be performed upon the part. Each department order (Form 135-3) has at the right end a move order, which is filled out and, when detached, is used as a routing schedule from one department to the next.

All of this control of movement from one department to another is centralized at a desk conveniently located. Here one man and a chaser take care of a vast amount of this routine work.

The factory production order and the completed department order going to the cost department form the basis for posting the charges against a particular job. The copy kept in the production department is finally forwarded to the payroll department after the work has been done. The time card goes with the department order and together they form the basis for paying the men.

Transfer of parts into finished-parts stock is made by the final inspector going over the work. The stock clerk receiving the material again counts it, enters it on his bin card and then the record is sent to the production department and entered on the store's record sheet illustrated as Form 156. Thence this record goes to the cost department for pricing. Here it is filed with the production order for that particular item, to be used in connection with cost figuring.

Incidentally, this record shows how the company

FACTORY PRODUCTION ORDER

NAME OF PART NON PRINT KEY CRANK — APPROVED

PART NO. WW-269-1 — ORD. NO. 3300 — QUAN. 1000 — DATE 4/11/30

BLANK AND FIN. TO STOCK

DATE	QUAN.	TOTAL	BAL.	DATE	QUAN.	TOTAL	BAL.

Form 40—Factory Production Order.

❖ ❖ ❖

Form 135-3—Department Order. At right end the Move Order, detached, becomes a routing schedule from department to department. Serial numbers, lower left, specify sequence of operations and identify time, on the men's time cards.

DEPARTMENT ORDER

PART NO. WW-269-1 — ORD. NO. 3300 — QUAN. 1000 — DATE 4/11/30

OPERATION BLANK — DEPT. 101

MACHINE NO. — SPEED — FEED

SCHEDULE START	SCHEDULE FINISH BY	DATE COMPLETED	NUMBER OF PIECES GOOD	DEFECTIVE	WORK GOOD	SPLIT ORDER NUMBER	DATE	QUANTITY

REMARKS

TOOLS REQUIRED

NAME	A.M.
3334 P&D	

224

MOVE ORDER

PART NO. WW-269-1

ORDER NO. 3300

QUANTITY

FROM DEPT.

TO DEPT.

DATE

uses its own product in turning out new product—just as the farmer uses some of his wheat as seed for his next crop. Additions and subtractions made in filling out this sheet are done automatically on the calculating typewriter on which it is written. The star at right of "new balance" shows that the counters in the machine have "cleared" and are ready for the next calculation.

An order which has been completed is marked "closed" on the record at the central clearing station in the factory, and also on the production order held in the production department. That department's copy of the factory production order then goes to the cost department and serves as notice that there will be no further time charges coming on this particular order.

During the progress of the work the time schedule of the parts production is kept in operation (Form 41). A red dot is placed at the end of the number of parts actually ordered. Adjustment of the projected schedule is made according to actual production re-

STORES RECORD

Description NON PRINT KEY CRANK Part No. WN-263-1

Maximum Limit | Ordering Limit | Shortage Limit

USAGE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	AVERAGE

Cost | Material | Item | Description | Amt. per 1000 Parts

Acct.	Ordered DATE	Ordered ORDER NO.	Ordered QUANTITY	Received DATE	Received ORDER NO.	Received QUANTITY	Issued DATE	Issued ORDER NO.	Issued OLD BALANCE	Issued QUAN. DEL.	Issued NEW BAL.	Short
	4/11/30	3300	1000	4/11/30	3300	1000	4/11/30	432	000	400	600	
			1000						1000		1000	
			000								000	

Form 156—Stores Record, showing orders, receipts and issuances of parts. When front is filled, the reverse of the card is used in same manner.

turns, whenever the stock of parts accumulating gets 10 per cent above or below the scheduled requirements. Depleted stocks will show up at once on this record.

They also show on the record in the stockroom. The stock clerk customarily sends a tickler to the production department whenever the supply of any particular part gets below a specified minimum. A list is made from the parts production schedule, showing parts due in the coming month. The stock chaser attached to the central clearing desk gets after all these shortages, and sees to it that the parts are completed when the month arrives when the schedule calls for them.

Master Operation Sheet Governs the Work

TIED in with the entire system is the master operation sheet shown. (Form 139). This specifies in detail every operation which is to be performed on the part, indicating the department, the machine tools and the special tools, gages and fixtures to be used. Departments, it may here be remarked, are numbered in accordance with the floor of the factory on which they are located. That is, those numbered from 100 to 199 are on the first floor, while those above 400 are on the fourth floor.

Many of the forms used in controlling production in this plant have been filled in for our illustrations, to show how the system works. Brief explanation will suffice to indicate how the forms are used and what vital information they supply as the weeks pass and production proceeds.

Parts Production—Schedule.—A definite lot of machines to be made within a stipulated period calls for monthly supply of certain parts, as shown in circled pencil figures in third column of Form 41. At the close of March the supply in stock of the several parts was that shown in column at right of that headed "Mar." Of the first item, 543 were in stock. Use of 160 each month in the second quarter would reduce the stock at end of June to 63. A red dot (shown here as a dot within a circle) indicates that existing stock (plus orders, if any) will suffice for requirements up to the time designated by the red dot.

But DD-186, fourth item in line, will not have enough material to complete the June requirements. With 610 pieces called for each month, and a stock of 1577 at end of March, the amount needed will call for 253 extra in June, to be supplied through new manufacture. Similarly, DD-343 will need 1322 in May and 1440 in June, in addition to what is available after April's needs have been met.

Hence a Master Operation Sheet (Form 139) is made out for each required part, showing in detail all operations, including inspection. The carbon copy of this, on a different form (139F), carries the same list of operations. This provides for following the work through the shop as it progresses, and recording the number of parts actually made on the order. Defectives are shown, with the good pieces carried forward to the next task.

After each operation the parts are sent to a checking station for counting. Then the order for the following operation is issued. When all processes have been completed the word "closed" is written in, as already explained. "Transfer to Stock" (Form 48) is then made out, certified as to quantity, and the material goes to finished-parts stock.

Department orders are numbered in rotation—lower left corner of Form 135-3. This serial number, placed on all time cards charged to the operation, serves to identify the time, and at the same time as-

MATERIAL
4/11/30

SIZE	QUALITY	TEMPER	FINISH

PIECES PER FT. | LENGTH PER 100 PCS. | WEIGHT PER 100 PCS.

MASTER OPERATION SHEET

NON PRINT KEY CRANK

ECON. RUN ____ ECON. PURCHASE ____

PART NUMBER
WH-269-1

DISPOSITION OF SCRAP

SCHEDULE DATA

STOCK SIZE FOR MULTIPLE OF ____ PIECES

QUANTITY PER MACHINE

	I	II	III	IV	V	VI
9 WH						
10 WH						
11 WH						
12 WH						
13 WH						
℄						

USED ON ASSEMBLY | NO. USED

DEPT.	DESCRIPTION OF OPERATION	MACHINE TOOL NO.	TOOLS	GAUGES	FIXTURES	PIECES PER HR.	OPER. TIME	TOTAL TIME	SPEED	FEED	% LOSS	WT. PER 100	REMARKS
101	BLANK	P-3 PRESS		3334 P&D									
101	PLANISH												
202	SPOT, DRILL, BURR AND C'SINK	DRILL PRESS		3627 DRILL PLATE									
	(SEE PRINT)			10880 MIC. (BB-121)									
204	1ST INSPECT			10-80 MIC. (BB-121)									
209	CLEAN AND OIL												
204	FINAL INSPECT												
402	STOCK												

Form 139—Master Operation Sheet—the heart of the system.

sures performance of the required operations in proper sequence.

All department orders are checked, in the manufacturing departments, against a machine load chart. The work is then scheduled according to the machine or man who will presently be available to perform it. At the same time, the order is placed in the department schedule board in accordance with the machine load chart.

Carrying Along the Factory Production Card

DURING all this process the factory production order (Form 40) is being gradually filled in, as one operation after another is completed. Deliveries to stock and parts scrapped are here posted, the information being taken from the Inspection Record, Form 49.

When the order appears to be complete the production department's copy of Form 40 is marked "closed" and is sent to the parts-in-process department (process control desk) for confirmation. On being returned, confirmed, the form is checked on the stores record (Form 156) and then sent to the cost department for costing the job.

Meanwhile Form 41, the Parts Production—Schedule, has not been idle. Shop orders, as issued, are entered on it, showing the period during which production is to proceed. Record is here made of deliveries to stock, this information coming from the inspector's report, Form 49, and shortage list is furnished process control monthly. A summary of actual production is kept, taken from data furnished by the Assembly Department on Form 83, Finished Machine Daily Report. On the basis of all of this information, intelligently analyzed, adjustment is made of the tentative schedule to fit actual production conditions.

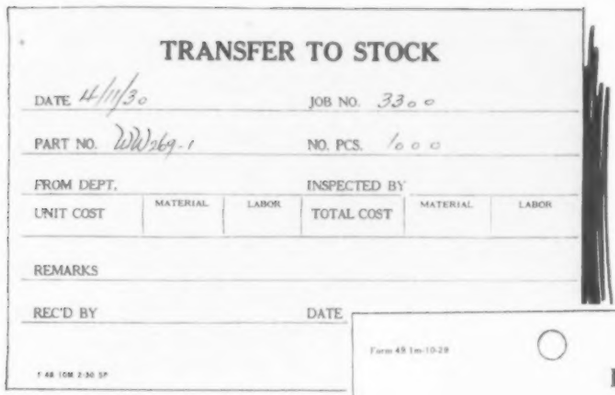
Similarly, Form 156—the Stores Record, or fin-

4/11/30

PART NUMBER
WH-269-1

		DATE 4-11-30 ORD. NO. 3280 QUAN. 1000 QUAN.	SPLIT ORDER NO.	DATE ORD. NO. QUAN.	SPLIT ORDER NO.	DATE ORD. NO. QUAN.	SPLIT ORDER NO.	DATE ORD. NO. QUAN.	SPLIT ORDER NO.
101	BLANK	4-11-1000							
101	PLANISH	1020							
202	SPOT, DRILL, BURR AND C'SINK	1020							
	(SEE PRINT)								
204	1ST INSPECT	1020	20 Rej.						
209	CLEAN AND OIL	1000							
204	FINAL INSPECT	1000							
402	STOCK	1000							
			Closed						

Form 139F—Made by carbon when Master Operation Sheet is typed, this form provides for following the work through the shop.



TRANSFER TO STOCK

DATE 4/11/30 JOB NO. 3300

PART NO. WW264-1 NO. PCS. 1000

FROM DEPT. INSPECTED BY

UNIT COST	MATERIAL	LABOR	TOTAL COST	MATERIAL	LABOR

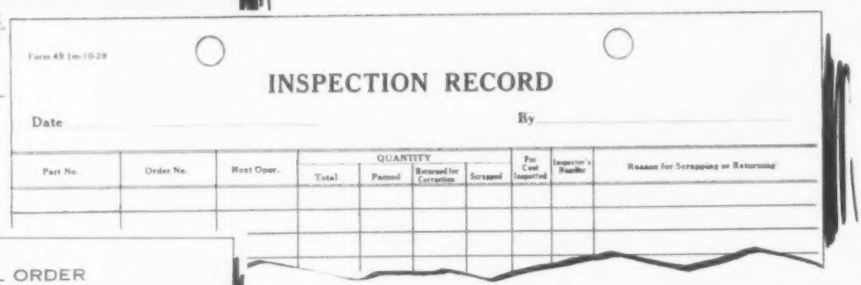
REMARKS

REC'D BY DATE

F 48 10M 2-30 SP

Form 48—Transfer to Stock, at left, carrying a completed lot of parts to finished parts storeroom.

Form 49—Inspection Record (below).



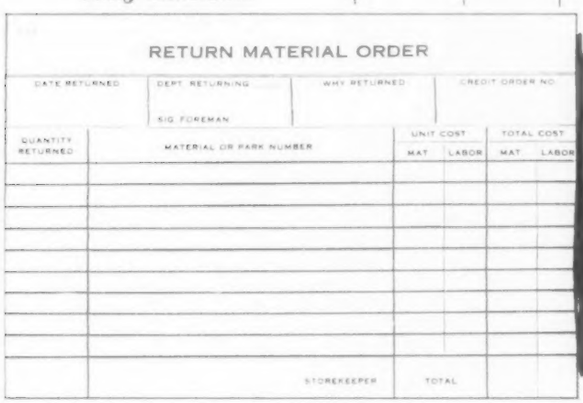
Form 48 1m-10-29

INSPECTION RECORD

Date By

Part No.	Order No.	Next Oper.	QUANTITY Total	Passed	Returned for Correction	Scrapped	Per Cent Inspected	Inspector's Number	Reason for Scrapping or Returning

Form 63 — Return Material Order, below, accompanying parts returned to stock after being withdrawn.



RETURN MATERIAL ORDER

DATE RETURNED	DEPT. RETURNING / SIG. FOREMAN	WHY RETURNED	CREDIT ORDER NO.

QUANTITY RETURNED	MATERIAL OR PART NUMBER	UNIT COST MAT.	UNIT COST LABOR	TOTAL COST MAT.	TOTAL COST LABOR
	STOREKEEPER		TOTAL		

ished stock ledger card—is undergoing continual revision as the work proceeds. The order is posted on it from Form 40. Delivery of finished stock is entered on it, taken from Form 48. Scrapped parts appear, on the basis of the inspector's report, Form 49.

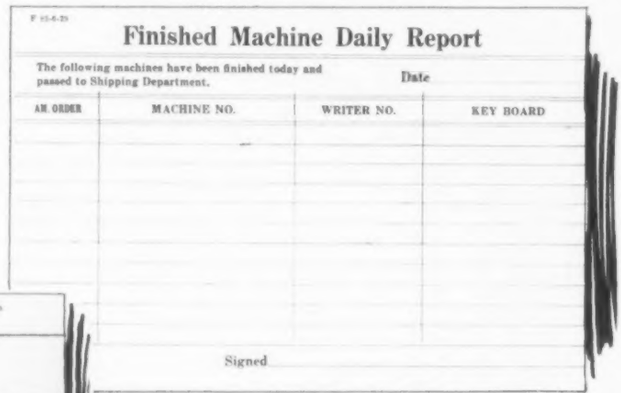
Withdrawals from stock are posted on this Form from the Finished Stock Order, Form 61. Withdrawals for assemblies are entered from Materials charts 189 and Stock Order 61. Finally, all closed orders are checked here, from the production office copy of Form 40, after this form has been certified by the process control department to be closed, on Form 139-F.

Handling Defectives and Returned Materials

Whenever, for any reason, good material is returned to stock after having been withdrawn, Form 63 accompanies it, explaining all the whys and wherefores. This serves to give credit to the order to which this material has been charged.

Material drawn from stock may be found defective. If so, Form 302, the Defective Material Exchange Order, is made out, in duplicate. One copy goes to the stockroom, serving as authority for issuing substitute parts to replace the defectives. The other copy accompanies the defective parts to the salvage department, where as much value as possible is extracted, and the remaining portions are thrown out as scrap.

Form 48, the Transfer to Stock, is made out by the inspector at final inspection of any lot of parts. They are counted at the checking station, and the form must certify to the count, as shown. This form accompanies the parts to the finished-stock storeroom, where it forms the basis for entry on Storeroom Record Card, Form 119. Form 48 then goes to



F 15-6-29

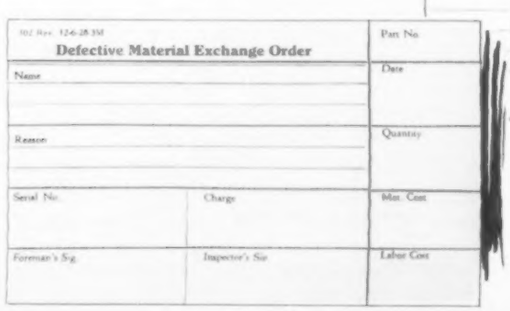
Finished Machine Daily Report

The following machines have been finished today and passed to Shipping Department. Date

AM. ORDER	MACHINE NO.	WRITER NO.	KEY BOARD

Signed

Form 83—Finished Machine Daily Report, above, on which a summary of production is kept.



102 Rev. 12-6-28 3M

Defective Material Exchange Order

Part No.

Name Date

Reason Quantity

Serial No. Charge Mat. Cost

Foreman's Sig. Inspector's Sig. Labor Cost

Form 302 — Defective Material Exchange Order, serving as authority to issue parts to replace defectives.

the production office to permit posting its information on Form 156 (Stores Record), and thence to Cost Department.

How Assemblies Are Followed

SUB-ASSEMBLIES made from finished parts are handled in somewhat the same manner as the original finished parts themselves. An Assembly List (Form 189) designates all the parts required for the work. A department order, Form 135-3, is made out to cover all operations.

Finished Stock Order, Form 61; Return Material Order, Form 63; Defective Material Exchange Order, Form 302; Defective Parts and Materials in Process, Form 303, all are employed in controlling this work. The Finished Machine Daily Report, Form 83, is merely an extension of this scheme, when sub-assemblies and connecting parts are brought together to form the product for final shipment.

PART NO. WW-269-1

STORE ROOM RECORD CARD

PART NAME NON PRINT KEY CRANK

MAX. MIN.

RECEIVED		ISSUED				RECEIVED		ISSUED			
DATE	AMT.	DATE	AMT.	BAL.	AMS. OR PROD.	DATE	AMT.	DATE	AMT.	BAL.	AMS. OR PROD.
4/4/30	1000			1000							
		4/11/30	400	600							

RUSH MEMO TO PROD. DEPT. WHEN _____ IN STOCK

Form 119—Storeroom Record Card, alike on both sides, forming a perpetual inventory record.

Counting of parts is required after each operation. Many parts are almost microscopic in size, such as some of the tiny screws—hence the counting is done on proportional scales. A lot of parts is put into the large scale pan and enough taken from there and put into the small scale pan to make the scales balance. Those in the small scale pan are then

Assembly List - Cost Sheet

Description 4 Rgr. 9 Wheel Setting Frame Assembled Part No. BDL-316-1-9

Prod. Order No. _____

Sheet No. 1 No. of Sheets 1 Quan. on Order _____ Serial No. _____ Date _____

Parts Required for this Assembly

	PART NO.	Unit Quan.	Quan. on Order	Quan. Delivered	Quan. Short	Material Cost	Labor Cost	Date of Revision
1	SC-114	1						
2	BDD-101	1						
3	BDD-103-1-9	1						
4	DL-104	3						
5	DD-138	2						
6	DD-156-2A	2						
7	BDD-184-1-9	1						
8	BDD-205-1-9	1						
9	BDL-216-9	1						
10	DD-218	2						
11	BDD-234	2						
12	DD-332	2						
13	DD-334	1						
14	1116-HN	4						
15	1304-HN	1						
16	1404-H	6						
17	1502-HN	6						
18	1503-HN	6						
19	8506-N	1						
20	9506	9						
21	9546	1						
22	9570	1						
23								
24								
25								
26								
27								
28								
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63								
64								
65								
66								

Checked

TOTAL

TOTAL COST _____

Sheet Date Apr. 30, 1929 Date Filled _____ By _____ Date Sent to Cost Dept. _____

NOTE — ○ Designates an Assembly

Form 189—Assembly List—Cost Sheet, used in calculating costs for a complete sub-assembly.

F.61 2-30-10M SP

FINISHED STOCK ORDER

Date _____ Foreman _____ Order _____

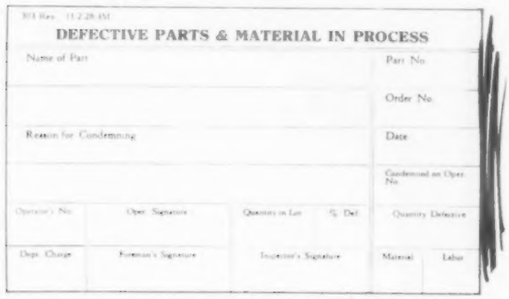
Quan. Ordered	PART NUMBER	Quan. Given Out	UNIT COST Material	UNIT COST Labor	TOTAL COST Material	TOTAL COST Labor
			TOTAL COST			

Date Filled _____ Book Check

Form 61 — Finished Stock Order, above, used in costing.

counted and the total number is 20 times the count. Experiments have shown that the use of a considerably higher factor was not satisfactory, and the 20 to 1 basis has been made standard.

Each department has a set of blueprints covering the items which it manufactures. This set is


DEFECTIVE PARTS & MATERIAL IN PROCESS

Name of Part | Part No.

Order No.

Reason for Condemning | Date

Condemned on Oper. No.

Operator's No. | Oper. Signature | Quantity in Lot | % Def. | Quantity Defective

Dept. Charge | Foreman's Signature | Inspector's Signature | Material | Labor

Form 303—Defective Parts and Material in Process, accompanying spoiled work.

kept up to date by the engineering department and covers all the work in which that department is interested.

Each department has also a sample case of the parts on which it performs any processes. Each such part is blackened and the surfaces which that department processes are then buffed to show where the work of the department applies. This combination of blueprints and samples serves to keep the department thoroughly informed and to avoid duplication of effort all along the line.

Along with the control of material going through is tied up, of course, an intimate knowledge of the working tools available. Particularly in the press department is this essential. Here there is a large accumulation of dies and fixtures for making and processing the various stamped parts.

Arrangement of the room is such that these fixtures are closely at hand, where they can be put into the presses with a minimum of delay. It is customary for experts to select and adjust the fixtures, preliminary to stopping the press on its run of previous work. This keeps the production men and the machines continually on production and results in having the presses idle for only a short period.

Coupled with a process of manufacture involving complete interchangeability of similar parts, the most exacting final inspection is necessary. This is provided for by master gages and fixtures for this purpose, designed for the most rapid work in disposing of the production as it accumulates.

▲ ▲ ▲

Has the Small Plant a Future?

(*Concluded from page* 1501)

tomers that is beyond the reach of the large corporation. It is an interesting commentary that on the average the workman in the small shop is higher skilled and therefore higher paid than in the production plant where human skill is replaced to a large extent by machinery.

Fifth, one of the biggest dangers facing the small shop is that the owner seemingly cannot find time to participate in association gatherings and to keep abreast of progress in his industry by reading faithfully his business paper; in other words, he cannot afford to sit off in a corner and ignore what is going on about him or he is likely to find his market slipping away.

▲ ▲ ▲

Scrap Handling and Cutting Oil Recovered Economically

(*Concluded from page* 1511)

of the uncrushed material, the former are in greater demand. The crushing is also an advantage in that it greatly facilitates handling and storage.

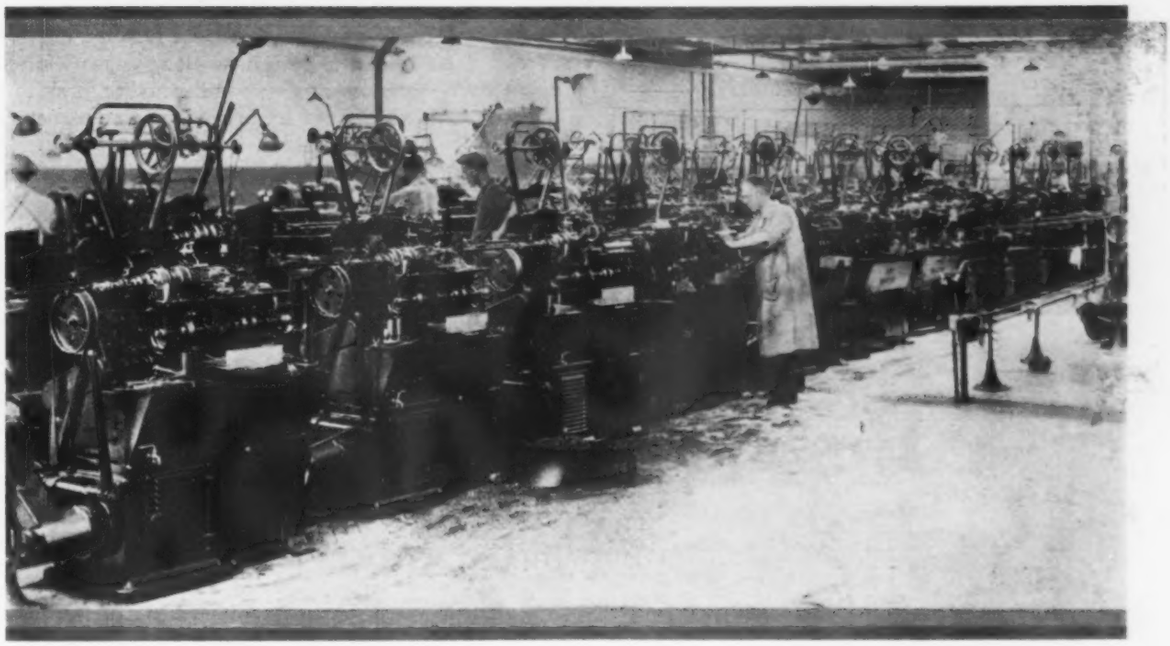
It might seem that our investment in equipment for handling a by-product is somewhat heavy for a plant normally employing about 500 men. All things considered, however, we feel that we could not afford to be without this equipment.

Before the installation of the chip hopper and continuous bucket elevator, the crushed chips had to be wheeled in barrows from the chip room to the yard next to the siding. Furthermore, the oil was separated after the chips had been crushed, instead of before, which resulted in the loss of considerable oil. Installation of a larger chip wringer enabled us to reverse the process, as described above, and to eliminate this waste of oil.

Previous to our present arrangement, cars were loaded by forking the chips from the yard level on to the belt of a portable conveyor which carried them into the cars. With this method the time required to load a car was nine man-hours, viz., three men working three hours. With the new arrangement 1½ man-hours, viz., three men working 30 min., is all that is required, and thus we are saving 7½ man-hours per car. This results in a yearly saving of $474 in labor and burden for this one operation.

In addition to the saving in money, the installation of this chip hopper and continuous bucket elevator together with the installation of oil burners on our heating boilers and underground oil storage tanks, enabled us to utilize yard space formerly required for the storage of coal and crushed chips. In this space a new building, approximately 86 ft. long and 60 ft. wide and containing about 5160 sq. ft. of floor space, has been erected to house the millwright, carpenter, painting, electrical and other service departments.

The present arrangement also enables us to keep the chip room in its present central location, which greatly shortens the distance traveled in carting the chips. Another advantage is that we have entirely eliminated demurrage charges on cars because of the reduced loading time.



PRESSED METAL WORK IN MAKING RADIO PARTS

By W. T. FULTON
New York District Manager
Surface Combustion Co.

PRESSED metal enters largely into the modern radio set. Some of the presses are unusual. Gas fired heat-treating furnaces are used in part for demagnetising steel cores.

TWO of the most modern mechanical setups in the United States, one for metal forming and the other for heat treating, are to be found in the Stromberg Carlson Telephone Mfg. Co.'s plant at Rochester, N. Y., where telephones, radios, loud speakers, etc., are manufactured.

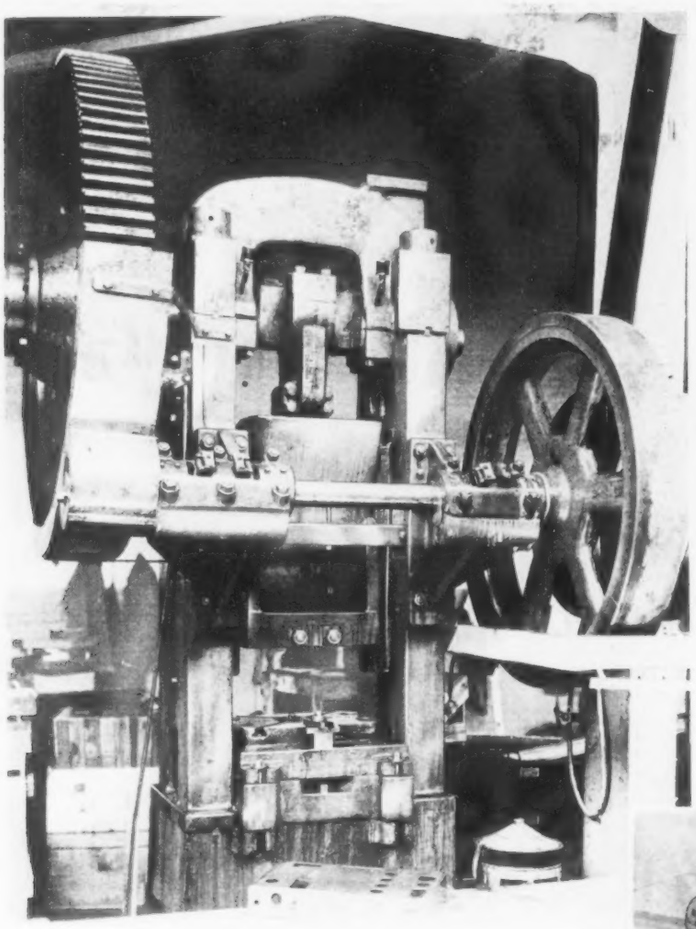
The metal-forming section is equipped with automatic screw machines for various parts and mechanically-driven presses of different types ranging up to 50 tons in capacity.

An Inverted Press a Feature

Two of these latter are of unusual design. Each is substantially an inverted press, with the ram and flywheel close to the floor. A steel base with four steel uprights holds a heavy steel mounting from which one of the dies is suspended. Operating continuously with an individual motor, this press or dieing machine, as it is called, is fed with 4-in. strip and is provided with feeding rolls on each end.

The parts formed drop down through the bottom die into a stacking chute, and the waste is automatically cut into convenient sizes by a scrap cutter, bolted to the frame. This machine operates at 200 r.p.m. and will cut 400 pieces per min.

Small flat springs are formed in a machine, the principal part of which is two steel rolls, one opposing the other, and one with toothed disks to hold the blanks from slipping. The springs when blanked are automatically stacked in a chute and this chute is placed on the spring machine in such a position as to feed the blanks directly into the rolls. These rolls give the blanks the correct spring shape and as the springs adhere to one of the rolls after forming, a sharp stationary knife strips them off so that



Radio chassis bases are formed on this press. One of the bases is shown at bottom of the press.

they fall into a tote box. This machine will form 34,000 springs an hour, which compares with a production limit of 1500 to 1800 per hr. with the old hand-fed press.

Inclinable presses are also in evidence and some of these are equipped with air nozzles with an automatic valve in the air supply line. When the press has been tripped and the part formed, the air is mechanically released and the part blown out of the press into a tote box. Others that are fed by hand are provided with mechanical guards, which automatically sweep across in front of the dies, when the press is tripped, and knock the hand of the operator out of the way in case he is a little slow. Still others are equipped with straightening rolls on each side of the dies, which straighten the material as it passes through.

Five Operations Make Loud Speaker Frames

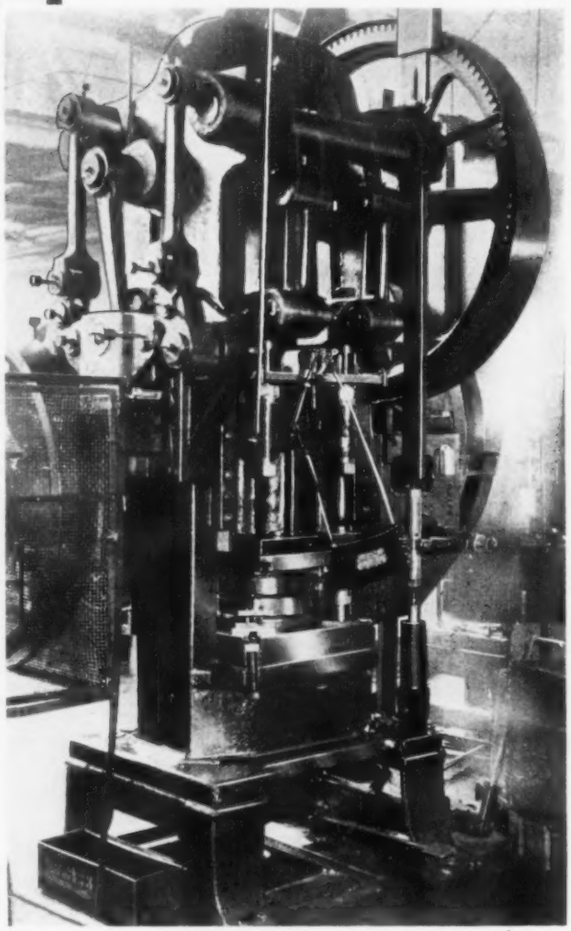
Loud speaker frames are formed in 8 and 10-ton presses in five operations, each operation being performed in a separate press and the presses lined up for progressive straight line production. The radio chassis base is formed from No. 11 gage strip steel in six operations in six different presses. The strip is of the exact width and the first press cuts to length and bends the ends. In the second, third and fourth presses, 50, 80 and 70 holes, respectively, are perforated. A forming die in the fifth turns up the two long edges while the sixth turns them still further and forms box sides $2\frac{3}{4}$ in. in height. The corners are then spot welded.

Relay cases are formed from sheet aluminum in three draws with an anneal between the second and third draws. They are then trimmed and the end flattened and perforated. A steel plate to hold the short circuiting ring is blanked from $\frac{1}{4}$-in. steel and five holes perforated in a single operation. These holes must be held within a tolerance of 0.002 in. Otherwise there is the probability that vibration and distortion would creep into the finished loud speaker.

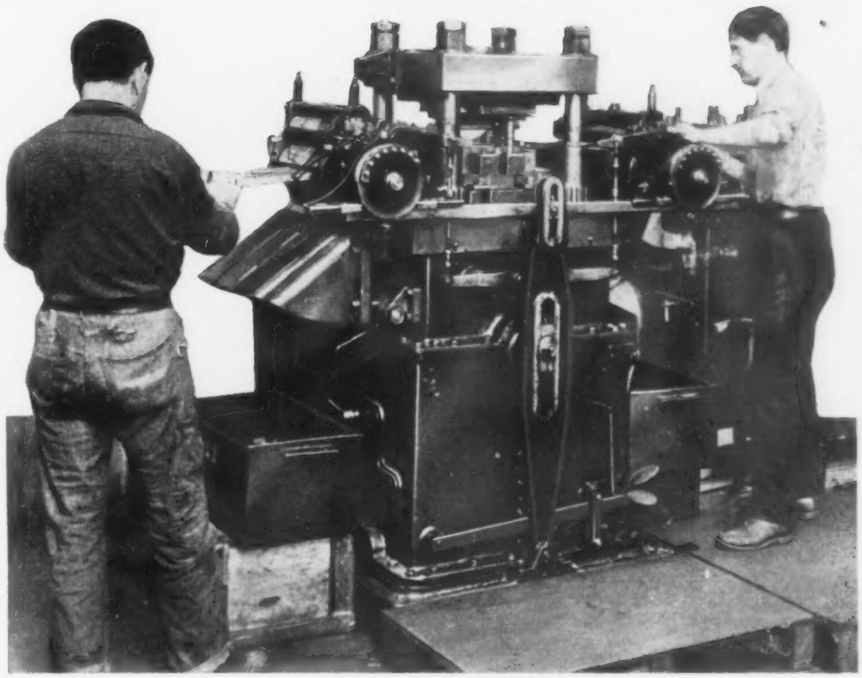
In the automatic screw machine division the machines are equipped with feeder tubes for the rod stock and these tubes are provided with a fixture which automatically springs a yellow disk into view when more raw material is required.

Two Furnaces in Heat-Treating Department

The heat-treating division is close to the metal forming department, and here anneal-



Press used for stamping frames for loud speakers.



An inverted press used at the Stromberg-Carlson plant for forming radio parts.

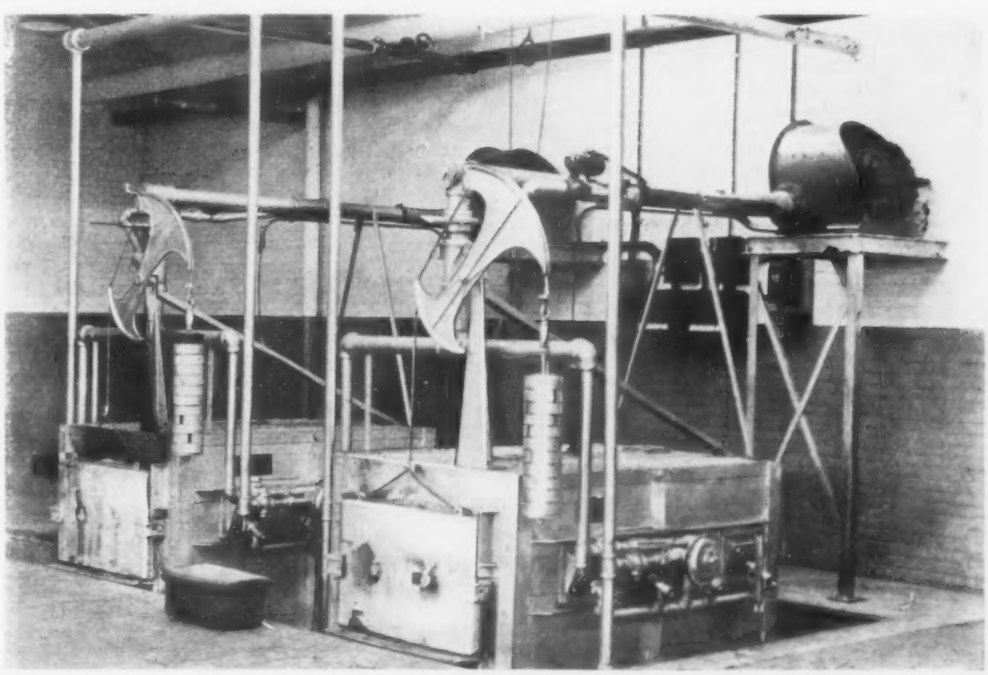
ing, hardening, carburizing, etc., are accomplished. The principal equipment consists of two gas-fired furnaces furnished by the Surface Combustion Co., Toledo, Ohio. These furnaces have definite operating characteristics and are rated specifically as to performance. They come in various sizes. The lining is of 4½-in. firebrick and tile with 2 in. of heat-resisting insulation.

The two particular furnaces in this plant have a hearth 30 by 60 in. and a door opening 18 in. high and 28 in. in width. Each is fired with the Surface Combustion equipment, four burners on each side, one set firing tangentially against the roof and the other under the hearth and from the opposite side. This is to assure complete circulation of the products of combustion and uniform heating.

Low-Pressure System Regulates Atmosphere

A low-pressure system is used, air being delivered at 1 lb. pressure to the automatic proportioning inspirator, while the gas is used at ordinary line pressure. The blower and air pipe can be seen just above the furnace in one of the illustrations. The firing system is equipped with an automatic temperature control which operates through a motor valve in a by-pass line on the main air line, also to be seen in the photograph. The main air line has a valve which is opened just enough to let the proper volume of air through to support combustion at the burners, which will just fall short of heating the furnace to the desired temperature. However, with the valve in the by-pass open, there is more than enough to heat the furnace. Hence, by the on-and-off action of the valve in the by-pass, the correct temperature is automatically maintained. These burners automatically maintain the desired furnace atmosphere regardless of pressure changes in the

(Concluded on page 1554)



Hearths of the low-pressure gas heat-treating furnaces are level with floor. Note blowers and automatic temperature controls.

DIE CASTINGS MAY NOW BE MADE OF BRASS

By L. H. MORIN

Chief Engineer,
Doehler Die Casting Co., New York

COMMERCIAL die castings have been confined to the so-called white metal alloys, such as lead, tin, zinc and aluminum. It would appear to the casual investigator that these metals were used instead of brass, because they were cheaper.

The cost of the metal itself in many die castings bears no relation to the total savings effected by the use of a die casting. The writer has seen innumerable parts, now die cast in a zinc alloy, which still would be considered cheap even if die cast of silver, provided it was impossible to die cast it in any other metal but silver. This statement appears paradoxical, but, compared to the expensive amount of machining necessary to machine some intricate and accurate parts, the cost of the metal becomes secondary. An example of such a part is illustrated in Fig. 1.

Obviously, the cheapest alloy or metal that answers the purpose should be used, but for many purposes the so-called white metal die castings are unsuitable, owing to mechanical, chemical and physical characteristics. Brass die castings would be ideal for many applications if they could be commercially and economically produced.

Since 1908, the Doehler Die Casting Co., New York, has experimented with making commercial brass die castings. Even at that early date, brass die castings were produced on a laboratory scale and, since that time, persistent experimentation has been carried on. Obviously, the usual methods and machines that had proved so successful in the production of the white metal die castings were tried, but were found wanting from a commercial or production standpoint.

Some of the Early Experiments

An early experiment consisted of inclosing both the die and a ladle of molten brass in an air-tight chamber. The ladle was then tipped while in the chamber by means of an exterior tilting mechanism, allowing the metal to flow into the die. Compressed air was then injected into the chamber which forced the metal into the impression or die under pressure.

Brass die castings were actually made by this process, but proved too

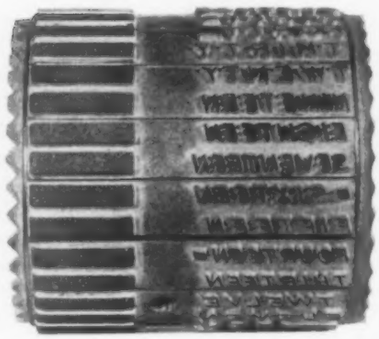


Fig. 1.—An expensive and intricate die casting made of a zinc base alloy.

costly from a commercial standpoint. In the first place, too much time was consumed in locking up the die in its air-tight chamber and at the same time inclosing a ladle of molten metal with it. The metal had to be kept extremely hot to maintain its fluidity during these time-consuming operations and, last but not least, there was the difficulty of obtaining a proper steel which would withstand the action of the hot molten metal.

Shrinkage conditions set up by the cooling of the metal in the die presented extreme difficulties in ejecting the finished castings from the mold, and this was made even further difficult due to the time that elapsed before the chamber could be opened and the die reached. We have kept this original machine in our collection as the machine which produced the first brass die casting.

Plunger Type of Machine Unsuitable

The common plunger type of casting machine of those days, when used for brass die casting, presented many difficulties, because it was impossible to obtain a melting pot, plunger and cylinder that would function and successfully withstand the action of molten brass with safety at high temperatures. The rapid chilling of the molten metal as it was forced from the cylinder along its discharge channels added to the complications.

Further experiments in the attempt to create a practical process for die casting brass brought forth a machine which embodied the principle of charging an insulated cup, or shell, with molten metal. This was preferably an asbestos cup which was set in a chamber above the entrance orifice of the die or mold. The insulated cup prevented the molten metal from chilling rapidly until such time as casting pressure was applied. In this case, presure was applied by a mechanical ram which action broke the insulated shell or cup and thus forced the metal into the die under pressure and in this manner created a brass die casting.

Special Steel for the Dies

Aside from the complications of this method, which are apparent, it was found that molten brass at this temperature seriously affected the steel from which the die was made. A word should be said about the material from which dies are made. Metal, when heated to a temperature so that it will be fluid enough to be transmitted into every impression of a die, also transmits this heat to the die proper upon contact, especially so when pressure is applied. In order to effect rapid chilling of the castings, the die must be provided with means of cooling. Water circulating through passages drilled into the die is the most economical and common method.

Obviously, it appears therefore that there is a continuous expanding and contracting condition set up in the die, which breaks down the structure of the steel. This action is purely a mechanical one and rapidly results in the cracking up or checking of the surface of the die. These cracks on the surface of the die reflect themselves on the surface of the casting and quickly render subsequent castings unfit for use because the fine finish and detail which a die casting provides are entirely lost. This condition has been met with before in our experience with the development of aluminum die castings, but was much more pronounced in our experiments with brass die castings.

Two Conditions Necessary to Success

It became easily obvious that metallurgical developments had to proceed hand in hand with the mechanical developments in making brass die castings. Our experiments taught us that

the ultimate brass die casting process would be one that embraced the following conditions:

1.—The handling of the metal at the lowest possible temperature.

2.—The removal of the finished casting from the die in the shortest possible time.

When these principles were practically applied, we became successful, and we are now producing quantities of brass die castings on a commercial, practical and profitable basis.

To accomplish the practical application of the necessary conditions as above stated, we had to perform all operations on the casting machines mechanically and in fixed synchronism. It takes but a fraction of a second between the time the metal is placed in the machine and the time that it is filling the impression, and within a fraction of a second thereafter the die is opening, the cores are being withdrawn and the casting is ejected.

Many Varieties Produced

A great variety of brass castings have been produced and the illustrations depict these. Fig. 2 is a knob used for acetylene apparatus. Note particularly that a steel insert has been cast in place. The wall stock on this piece is 0.085 in. thick.

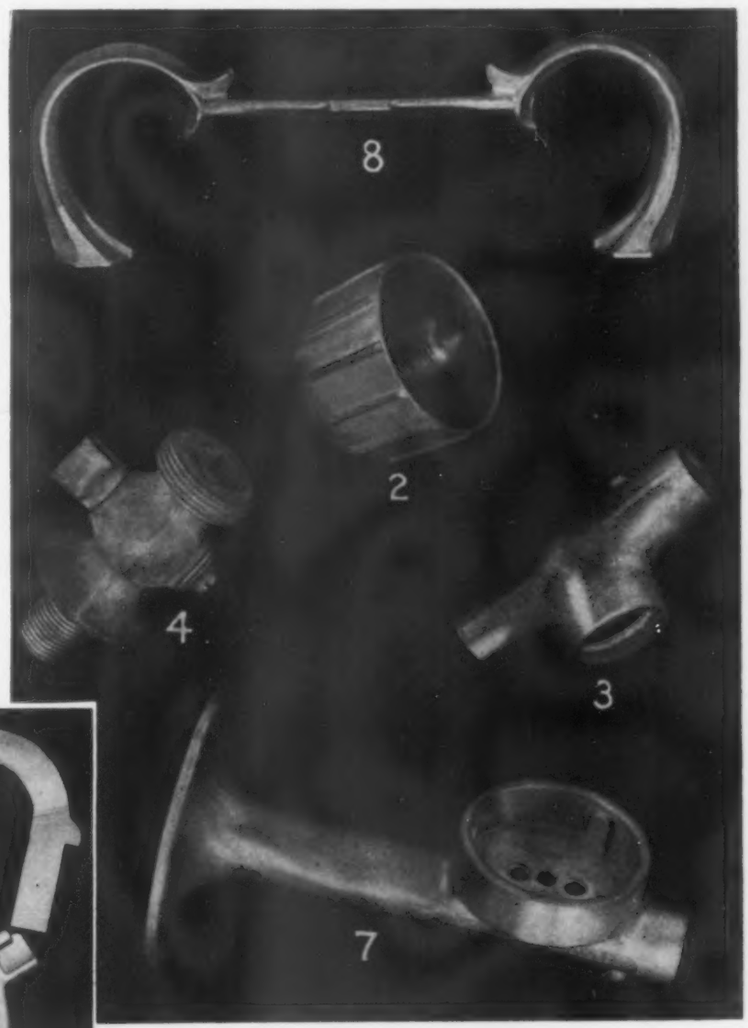
Fig. 3 is a valve body and is used for dispensing liquid soap through piping from a central supply tank. Zinc and aluminum die castings have not proved satisfactory for this application, because the soap solution rapidly deteriorated these metals and rendered the valve inoperative. Brass forgings were found to be expensive for this part, due to the excessive amount of machining necessary; it was necessary to machine all holes from the solid forging, and as a die casting all holes were cast. There are four cored holes, each 90 deg. apart, in this piece. Two of these cores have three steps and one hole is cast which is 0.147 in. in diameter and 9/32 in. long. The outside of this piece is polished and chrome plated. Due to a smooth surface finish, very little polishing before plating was required.

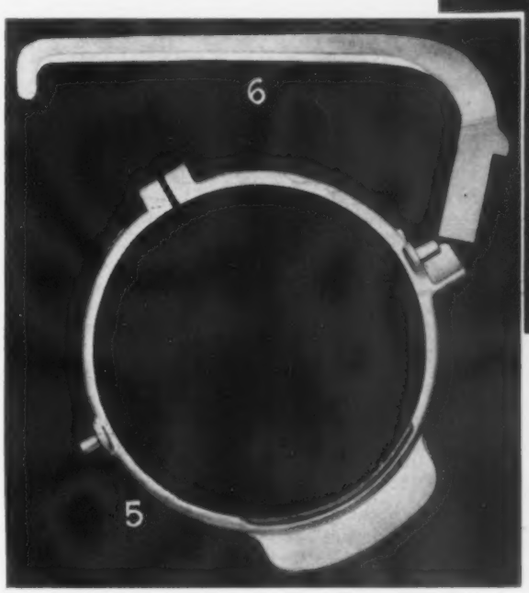
Fig. 4 is a shut-off valve which is used on the main supply tank of the soap dispenser referred to. On this particular job a 9/32-in. hole has been cast 1¾ in. deep and other holes have been cast in two other directions. This part takes a high-polish chromium plate and must receive a valve stem adaptable to be ground in with a leak-proof fit. This part likewise is subject to attack of a soap solution.

An interesting application of the brass die casting is shown in Fig. 5. It is a dispenser band, which clamps around the bowl of the familiar tilting bowl type of soap dispenser. It was a difficult and expensive piece to make before it was applied to brass die casting. The lift plate is cast 0.075 in. thick. Prior to the time this piece was made as a brass die casting, it was made by forming the circular section of extruded brass rod and then all the other projections and lugs were soldered on.

Fig. 6 is a part used in connection with a biscuit making machine. This is about 5½ in. long and the long tapered section has been cast to practically a knife edge. This part performs a scraping and cutting operation and is an example of the varied applications of the brass die casting.

Of particular note is the dispenser





SOME typical die castings made of brass: Fig. 2 is a knob used for acetylene apparatus. Fig. 3 is a valve body for a liquid soap dispenser. Fig. 4 is a shut-off valve on the main supply tank of the soap dispenser, which is illustrated by Fig. 7. Fig. 8 is an ornamental handle.

Fig. 5 (at left) is a soap dispenser band which clamps around the bowl. Fig. 6 is a part used with a biscuit-making machine.

body illustrated in Fig. 7. This piece measures 5 in. in overall length and the flange is 3 in. in diameter. The body section from the flange to the cup portion has been hollowed out to use a minimum of metal. Note the clean cut engraving that has been cast in the panel beneath the cup portion.

An ornamental handle is illustrated in Fig. 8. On this particular piece, note the clean lines and the art detail that can be executed by the brass die casting process.

The West Disinfecting Co., one of the largest companies making sanitary products, is a user of many of the brass die castings illustrated.

In conclusion, a word might be said as to the relation between brass and white metal die castings. Each embraces a certain field. The legitimate field of a white metal die casting will not be encroached upon by brass die castings. Brass die casting offers to industry an economy in manufacture heretofore unattainable in this metal. The era of commercial brass die castings is here.

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Universal Automatic Polishing and Buffing Machine

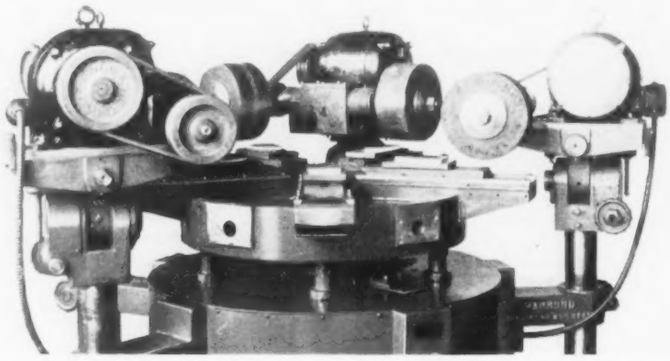
POLISHING and buffing of a wide variety of work is possible on a universal automatic machine brought out by Hammond Machinery Builders, Inc., Kalmazoo, Mich. Four polishing units, including wheel, V-belt drive and motor, are provided. As shown in the illustrations, these have universal mountings on vertically adjustable columns grouped around a work-holding table having five indexing stations. The many different set-ups possible make the machine suitable for frequent small duplicate runs as well as for long-run production.

Work-holding fixtures of various types are obtainable. Cylindrical work is best held on individually rotating work spindles, either vertical (as illustrated) or horizontal. Flat surfaces of limited dimensions may be polished by mounting the work on still another set of fixtures as shown in the second illustration. For this straight line polishing work platens are arranged to slide in radial ways mounted on the surface of the table. Automatic reciprocating motion of the platens by drive from the table-rotating motor carries the work under the wheels, in this case arranged with their rims in line with the reciprocating movement of the work.

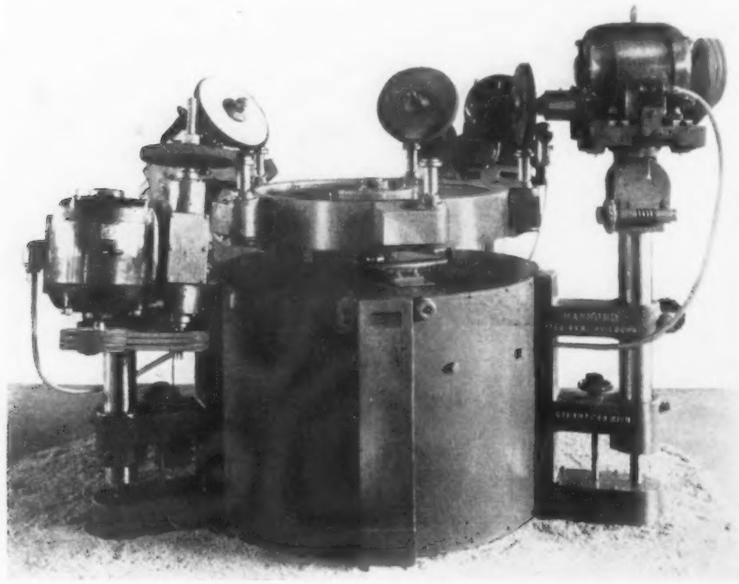
Small flat parts are conveniently polished by arranging the wheels at a tangent to the table and eliminating the indexing motion. In this case, the work table revolves continuously and the work passes from one wheel to the next in succession.

Once a fixture has been designed for a definite set-up and the proper polishing speed established and recorded, the process may be easily duplicated for subsequent work of a similar nature. Individual spindle rotation as well as table rotation is obtained through differential gearing. A Geneva motion of sturdy construction provides for table indexing and an automatic clutch stops the rotation of the work-holding fixtures at the loading position of the table.

The yielding effect or "give" of hand polishing is obtained on the machine by the adjustable spring balance mounting of the wheel driving motors. One of the long vertical screws by which this adjustment is made may be seen below the motor at the right of both views. The illustrations also indicate some of the many positions of the polishing wheels made possible by the universal mounting of these units.



Flat parts are polished as shown above. Below: A typical set-up for cylindrical work.



Up to 2000 pieces of work an hour can be handled by the five-station, four-wheel machine. Larger machines having six or seven spindles also are obtainable and provide higher production speeds. If necessary, the speed of the polishing and buffing wheels can be changed by altering the diameter of the V-belt sheaves. The polishing spindle bearings have a self-contained oscillating mechanism which can be made inoperative by a lever near the spindle bearings.

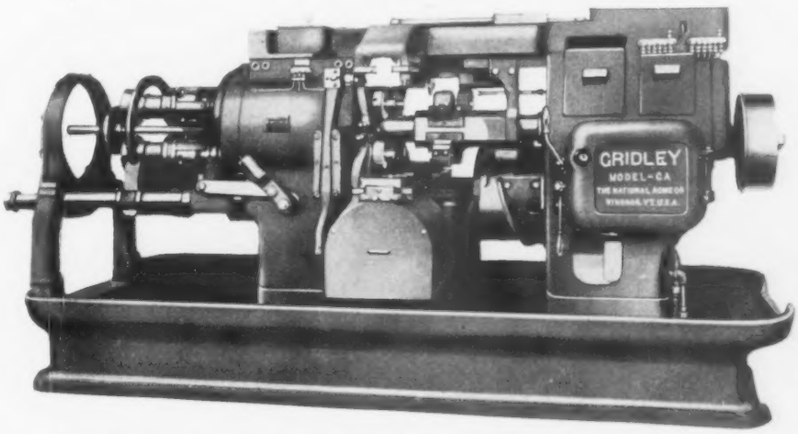
All bearings are dust-proof and of the anti-friction type. Magnetic switches for the motors are inclosed in the base which also contains gearing and motor for driving the table. Safety stop and start buttons are located at both front and rear of the machine. Exhaust hoods and guards for the V-belt drives are provided, but are not shown in the illustrations.

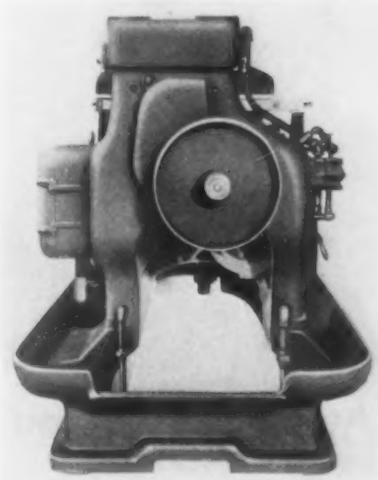
Of importance, especially during long runs, is the provision made for redressing the polishing wheels at the proper intervals. This operation is performed either manually or automatically under perfect control from the operator's station.

National Acme Develops New Automatic Screw Machine

HEAVY construction is a feature of the new multiple-spindle automatic screw machine illustrated, which, designated as the model GA, is being introduced by the National Acme Co., Cleveland.

The frame is of box form with two independent uprights and a heavy top bracket to assure maximum rigidity. Absence of vibration, even under heavy cuts, is emphasized; also greater production accuracy, longer tool life and shortened set-up time.





IN addition to increased rigidity, this new screw machine features markedly increased chip room. Straight-line pan construction permits the chip guards to be mounted on rollers so that they can be moved sidewise with little effort. The chip pan is designed to permit installation of chip removing conveyor.

Approximately four times the chip room is available as on previous models. The frame is designed so that chips from the cutting tools can drop through the center of the frame into the pan. The front portion of the machine, in being entirely open, provides additional chip room and easy access for tool adjustment. The straight-line pan construction permits chip guards, mounted on rollers, to be moved sideways with very little effort, a feature making for maximum convenience in making tool adjustments.

Oil drains from the chips through a perforated plate in the pan. Chips can be removed readily from both ends without stopping the machine. There is an exceptional amount of clearance between the frame and the pan at the center of the machine. The chip pan is designed to facilitate installation of a chip conveyor, or other device for the removal of chips. Because of the larger pan area, more rapid cooling of the oil is assured.

The spindle carrier, supported on three bearings, is approximately 5 in. longer than that of previous Gridley automatics, and the collet tubes and feed tubes are also longer.

Both the spools and the finger holders are made heavy to provide for a larger bearing surface for the chucking shoe. The finger holders are equipped with springs that prevent the fingers from flying out or loosening under high spindle speed. These springs are located inside of the finger holders so that no accident can occur when the machine is run without material in the collets. The feed tubes, guided inside of the finger holders and spindles, are controlled by a ring and disk so that at no time can the feed tubes be out of mesh with the feed slide when the cylinder is indexed.

The main tool-slide has been lengthened approximately 5 in. and slides on a hardened and ground extension of the spindle carrier. It is bronze bushed at each end and provided with a wiper in front to prevent grit or chips from entering between the bronze bushing and steel or extension of the carrier. The space between the spindle and the gear box section has also been lengthened approximately 5 in. to give additional strength to the main tool-slide and to provide more surface for mounting combination tools.

The forming and cut-off slides (the two bottom cross-slides) are of unusual length and width and are mounted on supports cast integral with the machine bed. The bed casting guides are hardened and ground steel plates fastened to these supports. Both slides are made of nickel iron. The two upper cross-slides are identical with the two bottom cross-slides in design, but are in a reverse position. Each slide, in all four positions, is independently accuated by cams on drums covered to exclude chips.

The chucking and feeding slide is supported by two heavy parallel shafts with extra long bearings to prevent side play or tipping action. Keys are not used in these slides. In addition to the two guide bearings, the chucking slide is supported at its extreme end with a guide shoe, which prevents side play and prolongs the life of the chucking shoe. The chucking shoes are provided with independent oil feed.

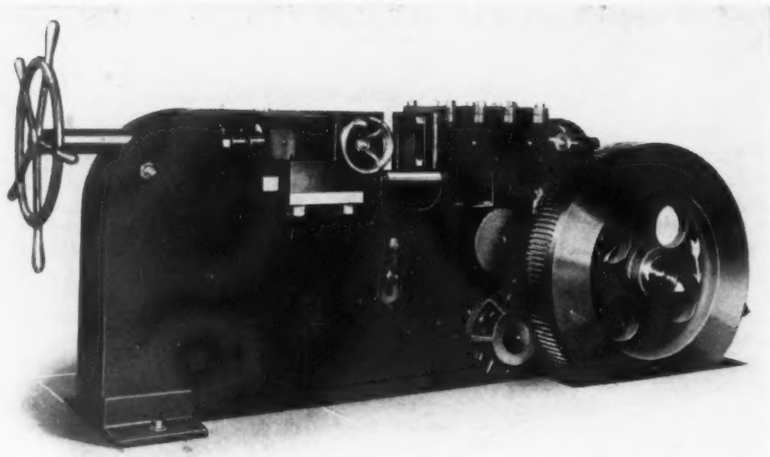
The main cam shaft is controlled by a worm and worm gear which also controls the indexing mechanism, cross-slides, tool-slide, feeding and chucking mechanism. The worm gear is equipped with a safety disk which permits the worm rim to rotate and the camshaft to stop in case of dull tools or interference with any part of the machine which would otherwise cause accidents or breakage. Neither shearing pins nor replacement of parts are required with this device.

Spindle gears are of the helical type. The gears in the gear box section, which is completely inclosed, are of hardened steel, with teeth burnished after hardening.

Lubrication is amply provided. The top bracket has three independent oil chambers. The center portion of the top bracket contains the cutting oil reservoir with several outlets at both ends to simplify the oil connection for each tool. A double pump is provided, for cutting-oil supply.

The stock stop is of the "disappearing" type, with a straight up-and-down movement, which gives sufficient clearance in the fourth position to permit the use of standard tools. The stock reel is fastened securely to the end of the frame and pan, giving accurate alinement and eliminating torque on the spindle carrier. Independent stops are provided for each of the four cross-slides as well as for the main tool-slide. The new "GA" can thread in the third or fourth positions, or both, and these same attachments can also be used for accelerated reaming or turning operations. High-speed drilling attachments can be used in all four positions.

Straightening Machine for Heavy Steel Members



AXLES, rails, beams, channels, tees and other shapes may be straightened in a machine recently announced by the Buffalo Forge Co., Buffalo. The machines are made in three sizes, designated as Nos. 47, 48 and 50, and providing ram pressures of 80, 130 and 190 tons respectively. Members having a maximum modulus of 9.5 can be handled by the No. 47 model; 23.1 by the No. 48, and 29.9 by the No. 50. These limits correspond to beam sections of 6 in. to 17.25 lb., 9 in. to 30 lb., and 10 in. to 35 lb.

As will be noted from the illustration, the design of the machines is similar to that of a horizontal punch. Three pressure blocks of hardened steel are employed, two of which are mounted on the carriage. These latter are adjustable laterally by means of a handwheel and move in unison, thus assuring equal spacing at all times. The standard shape of the pressure blocks may be changed to suit special work. A heavy screw, turned by means of a large handwheel at the rear of the machine, provides adjustment of the carriage. The distance between blocks can be varied from 6 to 14 in., 8 to 16 in., and 8 to 18 in. respectively in the three models.

Operation of the straightener is continuous. The plunger is gibbed on each side with bronze liners and slides between the frames. Maximum strength and light weight are claimed for the welded high-carbon steel frame. The plunger of the No. 47 machine operates at 40 strokes per min., that of the other two sizes at 35 strokes per min. Other specifications, listed for the three sizes in order, include: Length of stroke, 1, 1⅛ and 1¼ in.; size of driving motor, 5, 7½ and 10 hp.; overall length, 9½, 11½ and 13½ ft.; height, 2 ft. 3 in., 5 ft., 6 ft. 3 in.; and weight, 6850, 11,000 and 16,500 lb.

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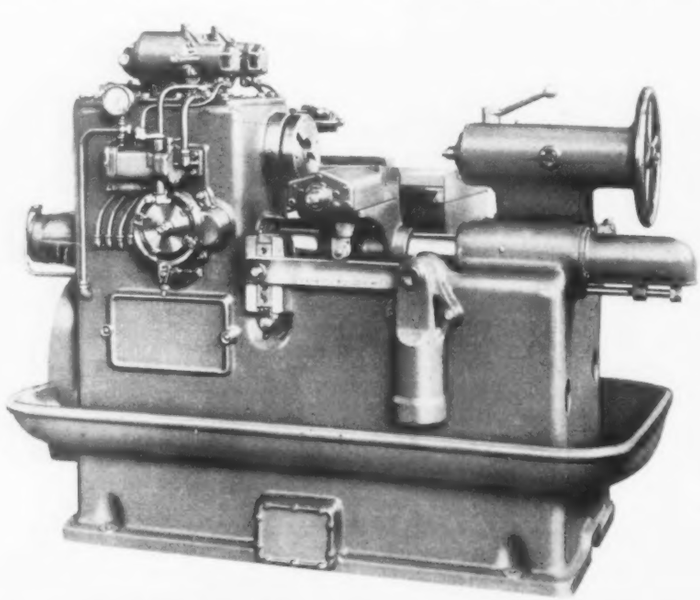
Automatic Hydraulic Lathe Has Integral Headstock, Bed and Base

HEADSTOCK, bed and base are incorporated in a single main casting in the No. 12 automatic lathe with "multi-range" hydraulic feed announced by the John S. Barnes Corpn., Rockford, Ill. This construction is emphasized as imparting unusual rigidity to eliminate vibration and to maintain alinement.

High spindle speeds permit steel as well as other metals to be turned with tungsten-carbide tools. Speed changes from 114 to 622 r.p.m. are made by means of pick-off gears. Spindle drive is through herringbone gears, making, with the pick-off gears, only two gear contacts in the machine. The spindle is mounted in anti-friction bearings and rotates clockwise, thus putting full load on the lathe bed. This feature is found also on the larger Barnes automatic lathes.



Feeds ranging from 0.001 to 0.1 in. per revolution of the main spindle are obtained by hydraulic pressure generated by Barnes pumps driven and controlled from the main spindle. This action is non-vacillatory. A separate Barnes gear pump supplies the rapid traverse which is controlled by a single lever. Speed and feed mechanisms are operated automatically in response to the rapid traverse action.

There are two carriages, each fed by a separate system and provided with a dial for setting the rate of feed desired. These dials are graduated to show the feeds in thousandths of an inch per revolution.

The front carriage is clamped upon and supported by a 4-in. diameter horizontal bar which is carried on bearings in the lathe bed. The headstock end of this bar is fastened to the piston rod of a horizontal cylinder which actuates the longitudinal feed. This feed motion is transmitted directly through the bar to the carriage. In-and-out feed is also di-

rect, the piston rod in a vertical cylinder on the front of the lathe being attached to a guide bar, the other end of which is pivoted to the lathe bed. A roller under the carriage runs on the guide bar. Accurate feeding to the required depth is assured as the guide bar is fed upward against a positive stop.

This arrangement provides a universal front carriage which can be employed not only for feeding the cutting tools to the required depth, but also for taper work. Vertical adjustment of the pivot at the end of the guide bar provides for taper cutting by inclining the bar according to the taper desired. For straight turning the bar is horizontal.

The rear tool carriage is bolted to a large flat surface of the lathe bed and can be moved longitudinally to whatever position is desired. The tailstock is equipped with a ball-bearing center.

Specifications of the No. 12 lathe include: Swing, 13 in.; distance between centers, 18 in.; diameter of hole in spindle, 1¼ in.; travel of front carriage, 7 in.; travel of rear carriage, 5 in.; floor space, 47 x 77 in.; weight, 5250 lb.

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Cold Forging and Stamping Press with Double-Geared Arrangement

ARRANGEMENT of the double gearing, the clutch and clutch-control mechanism are among the features of the cold forging and stamping press illustrated, which has just been completed by the Toledo Machine & Tool Co., Toledo, Ohio. The machine is particularly adapted for extruding valve heads, coining the covers of globe valves, and for other forming, stamping or forging operations within its capacity.

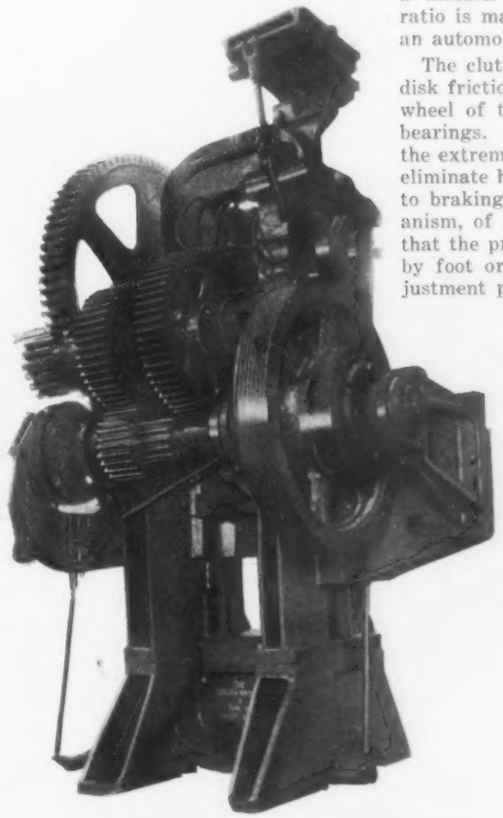
The frame is of the company's four-piece steel tie-rod construction, with forged steel tie rods. The crankshaft is of semi-eccentric type, heat treated, and will exert a pressure of 500 tons at the bottom of the stroke. The bearings are bronze bushed at both the frame and the connection. The slide of the particular machine illustrated is 24 x 26½ in., the bed measures 32 x 33 in., the stroke is 12 in., and the distance from the top of the bolster to the underface of the slide, stroke down and adjustment up, is 28 in. The press weighs approximately 85,000 lb.

From the rear view it will be seen that the press is double geared with an extra pinion on the driveshaft and an extra gear on the intermediate shaft to give two gear ratios, one of 8 to 1 and the other 20 to 1, to operate the press at either 12 or 30 strokes a minute. The change in the gear ratio is made very similar to that on an automobile.

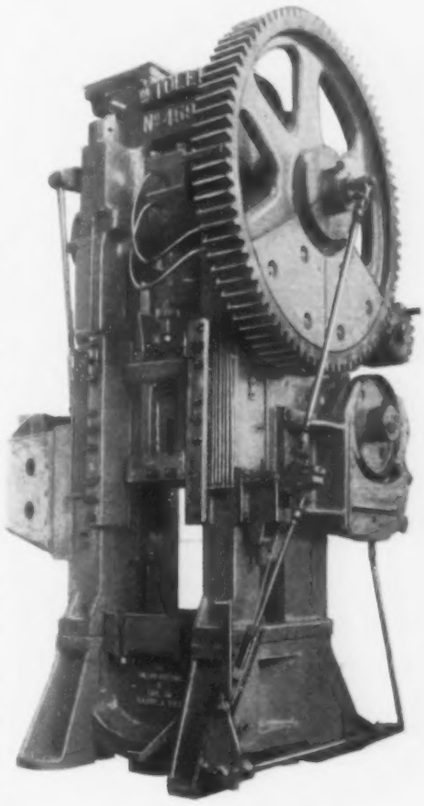
The clutch is of improved multiple-disk friction type, mounted in the flywheel of the press on Timken roller bearings. The brake is mounted at the extreme other end of the shaft, to eliminate heating up of the clutch due to braking. The clutch control mechanism, of new design, is arranged so that the press may be operated either by foot or hand lever. A simple adjustment permits the press to be run continuously or stopped automatically at the top center, or to be stopped instantly at any point of the stroke; the latter feature is very desirable when setting dies.

A cam-actuated lower lift-out is furnished for raising the work from the die after the forging or stamping has been completed.

Timken roller bearings are employed in the driveshaft, and the press is driven by a 30-hp. motor, the pulley of which is connected to the flywheel of the press by means of a belt drive.



THE double-gearing comprises an extra pinion on the drive shaft and an extra gear on the intermediate shaft is an important feature. Centralized system of lubrication (see front view at right) permits oiling main bearings from the floor.



Centralized forced feed lubrication permits oiling of all main bearings from the floor. The system includes individual piping to each bearing, and a power grease gun.

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Acquires Kelly Shapers

The Generai Engineering & Mfg. Co., St. Louis, has purchased the shaper manufacturing business of the R. A. Kelly Co., Xenia, Ohio. The Kelly shapers have been built since 1895. The General Engineering company was founded in 1917 to manufacture machinery.

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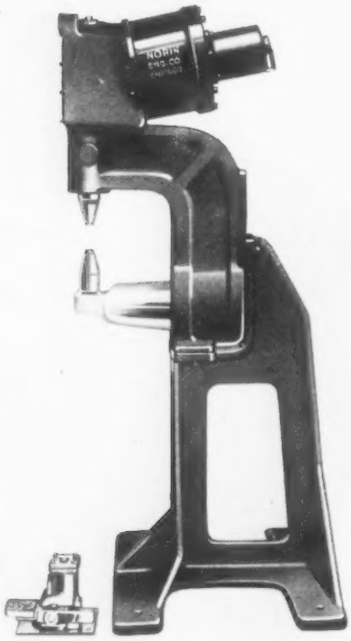
Production of babbitt metal in March 2,507,222 lb. in February, according to totaled 2,661,211 lb., compared with reports received by the Bureau of the Census from 43 establishments.

Pneumatic Riveter Employs Roller Wedge Action

A PNEUMATIC riveter featuring a roller wedge mechanism has been designed by the Norin Engineering Co., 355 North Union Park Court, Chicago. This riveter can be furnished with forged stakes to reach rivets in restricted places and it may be arranged vertically as illustrated, or in any other position, with a stationary base; or it may be equipped with adjustable crank suspension.



Sizes range from 6 to 100-ton capacity with reaches from 6 to 48 in. and gaps from 9 to 24 in.

The throat frame and wedge box are a single steel casting. The cylinders which are in tandem are made of cast iron. This tandem feature consists of a large air cylinder attached to the frame with a small cylinder attached to the head of the large cylinder. Both pistons are attached to the same rod which actuates two rollers in the wedge box. A three-way air valve furnishes pressure only to the large cylinder if air is available at 100 lb. per sq. in. If the shop pressure is only 80 lb., however, air is admitted to both cylinders, thereby retaining the full capacity of the machine despite the reduced air pressure.

The two rollers are placed one above the other and they are in contact. The upper roller follows an upper wedge that is attached to the frame. The lower roller is in contact with a wedge mounted on the riveter plunger. The piston forces the rollers between the two wedges. The contours of the wedges are curved so that there results a fast approach of the plunger and, as the pressure on the work increases, the speed of the plunger decreases. The last part of the plunger stroke affords a uniform pressure area. Both the wedges and the rollers are made of heat-treated steel and moving contact surfaces are ground.

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Manganese Steel Chute for Magnetic Separator

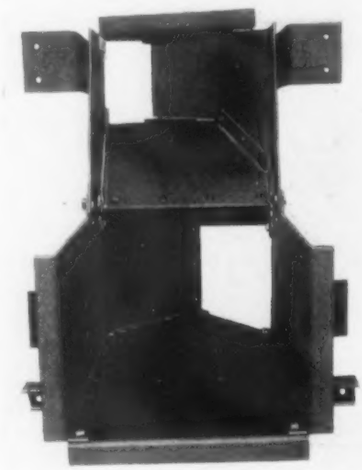
MANGANESE steel has non-magnetic and high wear-resisting qualities which have led to its application for making chutes for use with magnetic separators employed for removing tramp iron. The illustration shows one of these chutes recently supplied by the Manganese Steel Forge Co., Philadelphia.

It is of the double-discharge or bifurcated type, and was especially designed for installation in foundries, where it is used in conjunction with equipment for reconditioning sand. The magnetic separator takes the gaggers and iron out of the sand and discharges them into a bin through one of the spouts. Meanwhile the iron-free sand goes through the other spout and into a bin, from which it is fed into a reconditioning mill and then distributed to the plant.

As the chute is non-magnetic, the gaggers and iron removed from the sand do not cling to the sides. This eliminates chokage of the chute and also prevents wreckage of equipment.

In addition to the non-magnetic property, rolled manganese steel possesses abrasive resisting qualities far in excess of the copper-base metal alloys often used for chutes of this kind. Thus, greatly extended life is given to these chutes, and maintenance costs are reduced to a minimum.

The chute shown was fabricated from ¼-in. "Rol-Man" rolled manganese-steel plate. Any thickness of plate can be used, and the size and shape can be made to suit individual requirements.



Bifurcated chute made of rolled manganese-steel plate with non-magnetic and wear-resisting qualities.

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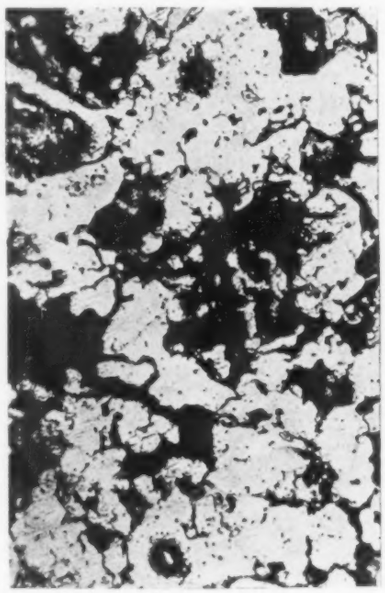
Bearing Metal Has High Oil Content

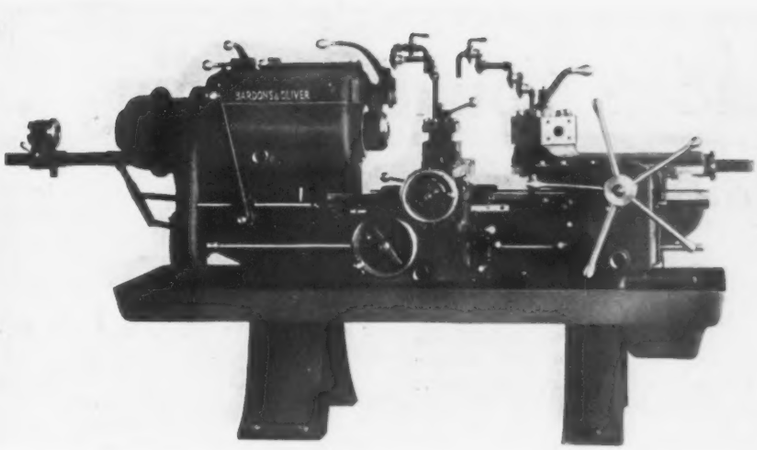
SELF-OILING bearing material called "Oilite" has been placed on the market by the Amplex Mfg. Co., 7900 Campau Avenue, Detroit, a division of the Chrysler Corpn. This material, an alloy of copper, tin and other metals, is compressed under high pressure, heat treated and then placed in a vacuum where it absorbs up to 40 per cent of hot oil by volume. Subsequent compression, as in a vise, or slight rises in temperature, as when exposed to direct sunlight, cause oil to seep from the material.



Oilite surface magnified 250 times to show porous nature of the material.

The hydraulic cushioning effect, due to the high oil content, combined with unusual strength, are emphasized as permitting this material to carry high bearing loads without damage to bearing or shaft. Manufacturing processes employed in the production of bearings of this material are said to assure a maximum percentage of bearing surface on the shaft.

"Oilite" has been adopted for spring shackle, steering gear cross-shaft and other bearings on many of the automobiles built by the Chrysler Corpn. It is said that spring shackles of "Oilite" seldom require additional lubrication during the life of a car.



New Universal Turret Lathe Uses Tungsten-Carbide Tools

HIGH spindle speeds, high power, wide feed range and ample rigidity permit the successful use of tungsten-carbide tools in the No. 4 universal turret lathe illustrated, which is a new product of Bardons & Oliver, Cleveland. In addition to increased production, the design provides for minimum fatigue of the operator.

Twelve spindle speeds, ranging from 38 to 1025 r.p.m., are provided by the head gearing. The spindle and shafts are mounted on anti-friction bearings and are so designed that multiple cuts may be made by both turret and carriage simultaneously. Helical gears, used on the spindle and higher speed shafts, provide a quiet and free running head at high speeds. The machine is driven by a 7½-hp. motor.

A speed reduction of approximately 3½ to 1 is obtained through two multiple-disk clutches in the head; these are in addition to the usual two multiple-disk clutches for starting, stopping and reversing the head. Rapid change of speed is thus possible, a factor of importance especially when changing from turning or drilling speeds to threading, tapping or reaming speeds. The other speed changes are made through gears sliding on six-splined shafts. Clutch and sliding levers are conveniently located on top of the head.

All gears and shafts are of heat-treated alloy steel and the gears operate in a bath of oil. No gears revolve on the spindle. The latter, a high carbon steel forging, has a flange type end to provide a rigid mounting for chucks or fixtures and to reduce overhang from the front spindle bearing. The driving motor is bolted to the end of the head, its rotor being pressed on to the first driving shaft.

The turret, carriage and cross-slide have nine feed changes, these being made independently at the aprons by convenient control levers. Feeds are engaged and disengaged by lever and cam-operated cone friction clutches. Disengagement of the feed is accomplished either automatically through feed stop screws, or by hand. The aprons are of inclosed box type and the gears, which are of heat-treated alloy steel, run in a bath of oil.

Turret slide and saddle as well as cross-slide and carriage castings are of high test nickel iron with bearing surfaces chilled. The saddle is of the cantilever type to permit the cross-slide carriage to pass partly underneath it and to give the turret slide a long bearing in the saddle with a reduced overhang. Return movement of the slide automatically indexes the turret as well as the stop cylinder. The latter carries six adjustable stops which actuate the automatic knock-out of the turret power feed.

The cross-slide and carriage have the usual longitudinal and cross power feed movements, permitting turning as well as facing with tools mounted on the cross-slide. The carriage is guided longitudinally by the front bed way and there is a tapered gib on the front side for adjustment. A binder handle locks the carriage longitudinally to the bed when the cross-slide is in use. The cross-slide feed screw is mounted on anti-friction bearings capable of carrying a heavy thrust load. A large graduated dial facilitates the setting of the cutter for various diameters.

Automatic indexing and clamping of the square turret on the cross-slide is accomplished by the binder handle on the top. Adjustment of the cutter for height is regulated by rocker wedges. The square turret is made of forged high-carbon steel.

The automatic chuck has improved features, including leverage, permitting a powerful grip on the work when heavy feeds are used, as well as elasticity to provide for slight variation in the size of the work being held. The collet may be of the solid type or the drawback type of master collet with false jaws may be supplied. The bar feed is of the double-bar type having a sliding head which bridges the two supporting bars and carries a revolving independent chuck. A link and lever mechanism actuated by the automatic chuck lever makes a long stroke available for feeding the bar forward. The same lever that opens and closes the automatic chuck also controls the bar feed.

The machine has a swing of 18 in. over bed, 16 in. over carriage guides and 9 in. over cross-slide. The width across the ways is 9 in. and the depth of bed is 11 in. The automatic chuck capacity is 1 13/16 in. for round stock, 1¼ for square and 1 9/16 for hexagon. The maximum distance from the end of the spindle to the turret face is 30 in. and the effective turning movement of the turret slide is 11 in.

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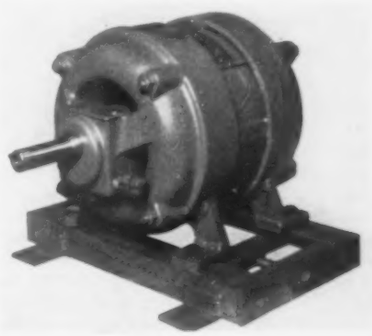
Welded Base for Motors

DESIGNED to be used instead of slide rails, an electric motor base of one piece welded construction has recently been announced by the Lin-



coln Electric Co., 12818 Coit Road, Cleveland. Constructed of rolled steel angles and flat bar stock welded into a homogeneous unit by the electric arc, these motor bases combine strength and stiffness with less than usual weight.

As shown in the illustration, the flanges of the angles to which the motor is bolted are slotted to permit moving the motor on the base by means of an adjusting screw in order to tighten the drive belt. Drilled angles are welded to the slides of the base to form hold-down lugs for securing the base in position.

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Bristol Co., Waterbury, Conn., manufacturer of recording instruments, has moved its Pittsburgh offices from the Frick Building to the Koppers Building.

Business Leaders Sound Warning Against Panaceas

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"THE mountain labored and brought forth a mouse." The nineteenth annual meeting of the Chamber of Commerce of the United States, held at Atlantic City, N. J., April 28 to May 1, had as its main theme the subject of business stabilization, with attention focused on measures calculated to bring about a recovery from the present depression, but few definite proposals crystallized out of the discussion and these were not offered in the guise of cures for cyclical disturbances.

It is no disparagement of the National Chamber to record its failure to produce a "plan" to pull us out of the depression. It is rather a tribute to that body that it recognized the danger of adopting half-baked proposals at a time when so much hysteria and quackery are in the air.

Few departures from our present competitive system are recommended by Chamber of Commerce of United States.

* * *

Radical proposals are viewed with distrust at a time when "hysteria and quackery" are in the air.

* * *

State unemployment insurance is opposed as unsound and as failing to offer a "major solution" of industrial idleness.

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Stabilization is discussed at length but without resulting in definite recommendations in the chamber's resolutions.

* * *

Cycles are declared inevitable and no specific for the present depression is seen.

* * *

Government competition with private enterprise is condemned.

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No Single Remedy for the Depression

"Business judgment," declared Julius H. Barnes, chairman of the board of the National Chamber, "cannot proclaim any single panacea as the immediate remedy of depression on so complex a scale. A myriad of individual judgments, applied each in their own field of endeavor, must supply the healing influences by which health is regained. Business judgment, invested with the responsibility of the conduct of industry, realizes that its chief duty rests in the maintenance of employment for the forty millions engaged in productive earnings, as well as efforts to reabsorb the five millions out of work. . . .

"The danger is that emotionalism, which will not patiently study and analyze the vast influences at play, may resort under shortsighted leadership to the paralyzing interjection of government into the free play of unfettered effort."

So-called "planned production" and State unemployment insurance had their advocates among the speakers at the various sessions, but the preponderance of opinion was that modifications of our competitive system should be made cautiously and that further intrusions of government in business should be avoided so far as possible.

No Unanimity of Opinion on Trust Laws

Chairman Barnes roundly condemned governmental interference with the sugar, coffee, silk, rubber, nitrate, wheat and cotton markets, but asked a reconsideration of our anti-trust laws. Other speakers, however, were not a unit in favoring a relaxation of anti-trust legislation.

For instance, G. Carroll Todd, former assistant to the United States Attorney General, stated that "the alternative to the competitive system—that in which output and prices are controlled—means inevitably governmental control, since control of output and prices by private agreement would never be tolerated." He asserted that when men enter into a transaction in good faith, believing it is lawful, they are now largely protected from criminal prosecution by the Department of Justice policy of instituting a civil proceeding, entering a consent decree or by serving notice and giving the parties concerned an opportunity to abandon or modify the transaction. Vesting an administrative agency with authority to give opinions in advance would have the disadvantage, moreover, of involving a formidable addition to governmental bureaucracy.

"If men had the right to submit transactions to a department of the Government for an opinion as to their legality under the anti-trust laws, the tendency would be to do so not only in the really doubtful cases but in every case as a matter of caution," said Mr. Todd.

"If a transaction were submitted and an opinion obtained, controversies would inevitably arise as to whether all the facts had been stated, or whether the transaction was put into effect in the exact form submitted, or whether conditions had changed so as to make the opinion inapplicable, and these would lead to uncertainties no less troublesome than those now existing."

Correcting Over-Exploitation of Natural Resources

Mr. Todd admitted that special consideration might have to be given to the modification of anti-trust laws in the case of industries afflicted with overproduction. He drew a distinction between "chronic" overproduction, such as exists in the exploitation of oil and other natural resources, and "transitory" overproduction, due to temporary lack of balance between supply and demand.

When overproduction is "brought about by the bounty of nature or by the operation of natural laws of trade, and not by the stimulation of a high price level maintained by unlawful agreement, it is by no means certain that an agreement to correct it, if properly limited and not accompanied by any understanding as to prices, would be held to be a violation of the anti-trust laws."

He suggested the feasibility of amending anti-trust legislation to provide that when overproduction is found, after open hearings before an appropriate Government agency, to be injurious to the public interest, concerted regulation of output be permitted until the condition described has passed.

The national chamber itself refrained from making any positive recommendation regarding the anti-trust laws. A resolution on the subject merely urged that the board of directors consider the advisability of appointing a committee to study the effect of the present laws on business generally as well as in relation to par-

ticular fields of enterprise, such as the natural resource industries.

Progress in Employment Stabilization

The national chamber likewise failed to take any action regarding stabilization beyond indorsing the recent appointment of a committee on continuity of business and employment. This body is now studying employment stabilization with a view to finding a "means for relieving such unemployment distress as may unavoidably occur from time to time" and providing a "rational program of production and distribution to be initiated by business itself."

A comprehensive scheme of stabilization by industries was outlined in a paper by L. C. Reynolds, comptroller and assistant to the president, American Writing Paper Co., Inc., Holyoke, Mass. Under this plan national trade organizations would be authorized by law to estimate consumption, to budget production and to control plant expansion. At the same time reserves would be set aside to guarantee an income to labor, just as surplus accounts are now built up to guarantee return to capital.

A practical scheme of employment stabilization already in effect among Rochester, N. Y., plants was described by M. B. Folsom, assistant treasurer, Eastman Kodak Co. Fourteen companies varying in size from 45 employees to 13,000 and representing many types of industries have adopted an unemployment benefit plan under which a reserve is set up providing 60 per cent of normal wages over a period of six to 13 weeks, depending on the length of service. It is estimated that it will take 1 to 2 per cent of the payroll over a period of years to set up the necessary reserves. Sufficient funds will have been accumulated by 1933, it is believed, to permit the payment of unemployment benefits in that year if necessary. The benefit plan will serve as an incentive to the employer to stabilize operations further and the benefits to the employer will, it is held, largely offset the possible cost of the plan.

Mr. Folsom admitted that some companies find it much more difficult to stabilize production than others, but he felt that practically any concern could reduce fluctuations if the problem were recognized and a real effort made to meet it. To accomplish very much it is necessary to build up a fact-finding organization to study the problem carefully, measure fluctuations, make forecasts and in general suggest methods for reducing fluctuations.

Doubts Wide Adoption of Stabilization

Doubts whether industry as a whole will do much to promote employment stabilization were expressed by Prof. Joseph H. Willits of the University of Pennsylvania, who pointed out that regularization plans that have been adopted, although admirable, were the exception rather than the rule. Enthusiasm for stabilization will wane when business improves, he said, and it is probable that when the next depression comes, say, in 1938, industry will find itself little further on the road toward employment regularization than now. The stabilization movement can only be made effective, in his opinion, when industry supplements it with an organization analogous to the National Safety Council.

State Unemployment Insurance Opposed

Most speakers were skeptical of the advisability of State unemployment insurance. P. Tecumseh Sherman, New York, said that the present crisis called for emergency measures for the relief of distress and the study of methods of preventing recurrences of like distress, but that "it is a very bad time for the actual adoption of anything in the line of social insurance that, once adopted, would be difficult to discard. There are too many delusions current about the supposed benefits of the European social insurances and too much ignorance of their shortcomings, their dangerous tendencies and their cost—particularly of the huge burden of bureaucracy they entail and of their depressing effects upon the earnings and opportunities of the efficient and industrious workers."

The unemployment risk is not, in all its types, predictable within reasonable limits, declared Leroy A. Lincoln, vice-president and general counsel, Metropolitan Life Insurance Co., New York. This is shown "by the enormous degree to which the current number of unemployed in England and Germany exceeds the number expected by those who drafted the unemployment insurance laws in those countries." He added that "insurance has not been able and probably never will be able to provide against loss from long protracted unemployment due to continued depression, without becoming, at least in part, relief or charity instead of insurance.

Insurance Not a Major Solution

"Insurance, in itself, cannot furnish the major solution for the general problems of unemployment," asserted Mr. Lincoln. "It seems impossible in any large-scale scheme, subject to the vicissitudes of political maneuvers, whether or not it is called insurance, to exclude those who properly should be classified as unemployables—that is, those whose condition is one of *absence* of income and not *loss* of income. For them the proper form of relief should be charity. Their inclusion in an insurance scheme can only result in its practical disintegration as legitimate insurance. . . .

"The danger against which we must be constantly on our guard is that too much emphasis on the possibilities of unemployment insurance is likely to result in too little attention to the necessity of stabilizing employment conditions themselves."

A point frequently overlooked and one that Mr. Lincoln emphasized is that any insurance plan requires the accumulation of funds prior to the time that payments are necessary to the insured. Even private unemployment insurance plans recently adopted will not become operative until two or three years hence, when the present emergency will presumably be past. The practical problem today, as Chairman Barnes pointed out, is to keep the employed at work and, if possible, reabsorb those out of work.

Keeping Workers Employed the Best Plan

Recognition of the responsibility of industry to do all in its power to keep workers employed constitutes the outstanding difference between the present depression and its predecessors, according to Hon. Robert P. Lamont, Secretary of Commerce, who addressed the opening session of the convention. "The great industries of the country responded in fine spirit to the President's request that wages be maintained and that construction and extension programs be undertaken. By schemes for staggering employment, varied to meet conditions in different industries, by carrying forward repairs, alterations and new construction—frequently in advance of actual needs—by money loans, advances and credits to former employees to whom it was impossible to give work, by deferring credit payments and installment obligations, and in many other ways, industry generally has shown an interest in its workers of a quality never before seen in this or any other country. Labor's attitude as well has been a most enlightened one, showing that the workers recognized quite fully the difficulties and problems confronting their employers."

No Immediate Remedy for Depression

Secretary Lamont described the present slump as one of the greatest depressions in our history and added that "no governmental policy, however wise, no individual, however powerful, no single industry, however great, can promptly bring about a change in a situation such as that in which we now find ourselves. The forces are too vast and powerful."

He said that it is apparent that any efforts to ameliorate the severity of depression after the collapse has commenced cannot be very effective. If there be a cure it involves "sitting on the bulge" before the speculative boom has got out of control.

"But who is to sit on the bulge and when? How shall we know when the stage has been reached which requires a flattening of the boom? The job can be done only by industry itself. With respect to financial and credit consideration, the banks will have to exert the necessary pressure or restraint before the acute phase has been reached. In the maintenance of a better balance between production and consumption, in keeping prices on a

fair level, in fostering a sound business policy and practices, in developing a spirit of 'live and let live' in competition for sales—all of these influences must come from industry itself, and there are many indications that much can and will be done in this direction.

"A most important factor in aiding these developments is the growing tendency among the individual units of industry to take into account in their own planning the interest and welfare of the industry as a whole. The development of the American trade association movement has been and will continue to be a very significant influence in the direction of greater business stability. And there are many things that can be done in this direction within the bounds of legal sanction."

Says Cycles Are Inevitable

Hopes of materially smoothing out the cyclical curve, however, were voiced by few at the meeting either in public discussion or in private conversation.

"I have come to believe," said Fred M. Sargent, president, Chicago & North Western Railway, "that these major economic trends are governed by such a variety of causes, physical and psychological, that they come and go as inevitably as the tides of the ocean. I believe that artificial tinkering with this or that natural law will, in the long run, have little or no effect in bringing about prosperity or preventing depressions. I have no hope that any panacea can be found which will cause the masses of mankind everywhere over the earth to shape their living in such a way as to prevent alternating periods of depression and high prosperity.

"This, be it noted, is not acceptance of a theory of economic drift. To drift is to move without law or purpose. The tides of the ocean rise and recede with mathematical regularity. The tides of business also rise and recede. It is our obligation as intelligent human beings to know better than we do now the laws of these risings and recessions—not for the purpose, presumably, of preventing them, but for the purpose of adapting ourselves to them with fewer bruises and bumps. Ships move safely with the tide. So should business."

The Economic Tower of Babel

With reference to business forecasting Mr. Sargent commented on the "confusion of prophets and diagnosticians." "Prophecy in reasonable doses is good for us," he stated. "But we run the risk of mental dyspepsia when we listen too trustingly to those whose views are highly colored (and whose are not?) by the particular prisms through which they happen to see the world; to wit, their immediate surroundings and business contacts and interests. . . . A nationally known scholar of great ability says: 'Raise wages; lessen the hours of labor; lower prices.' Having done that little thing, he says, our perplexities will vanish. I confess it would be delightful to do these things—if prosperity returned. But how they of themselves could bring back prosperity, even if there were a practical way of doing them, I cannot quite see. I fancy the gentleman expects us to raise ourselves by our own bootstraps!"

Referring to the great diversity of opinions expressed by economists, Mr. Sargent said that he had a mind to gather them all together in one volume and call it a "Bibliography of Scientific Disagreement."

Government Competition with Private Business Condemned

Government competition with private enterprise was condemned by Mr. Sargent and was also the subject of a resolution passed by the national chamber. Members and directors of that body were enlisted to make a "survey of the forms and extent of Government competition in the fields of business enterprise and to lead the business interests of the country and their organizations in a continuous and aggressive effort to have the Government withdraw from existing competition as soon as necessary preparation and adjustment can be made."

A resolution dealing with "unfair competition from abroad" declared that questions of great importance to American producers in the domestic market had been raised by the circumstances surrounding production in Russia of lumber, pulpwood and manganese. Other resolutions urged retrenchment in governmental expenditures and downward revision of taxes on capital gains.

Chairman Barnes, in his address, urged a downward revision of the tariff, a proposal that has already drawn fire from United States Senators Smoot and Watson. Senator Watson declared, in a statement to the press, that tariff rates are effective against only 34 per cent of our imports and that most of the higher rates are on luxuries. The history of high tariffs, he added, was that imports in ordinary circumstances increased, while never "in a single instance" have low tariff rates contributed to our prosperity.

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A short course in industrial gas engineering, under the direction of the university and the auspices of the Illinois Gas Association, will be held at the University of Illinois beginning June 15 and lasting throughout the week. Further information can be had by addressing A. D. Frydendal, People's Gas Light & Coke Co., Chicago.

URGES COOPERATION BETWEEN TRADE ASSOCIATIONS AND BUSINESS PAPERS

TRADE associations need at this time as never before the cooperation of the trade publications in all fields. Successful operation depends largely upon the character of cooperation extended by the trade publications.

How can wholehearted support be expected when we find so many associations publishing journals that enter into direct competition with the trade publications?

In these troublous times every industry must depend upon its trade organization and publications for leadership in meeting the present-day economic problems. Working indifferently or independently of one another, little progress can be expected. Success depends upon the interdependence of one upon the other, or an intimate understanding of the proper function of each. There should exist a bond of sympathy that inspires coordinated approach to all problems involved. To achieve this end, reliance must be placed upon two distinct abilities, those of a publisher and of an organizer, and they are as different as a dog and a cat. An organizer attempting to be his own publisher would wreck any undertaking. A publisher trying to organize anything would be as ungainly as an elephant trying to waltz. A combination of the two talents working harmoniously for a common end can lead industry through the bewildering mazes that now confront it.

Constructive cooperation between the trade association and trade journals should be the first aim of every organization executive. This can be achieved only when associations abandon any form of competition with trade publications.—CHARLES F. ABBOTT, *executive director, American Institute of Steel Construction. From an address before the Chamber of Commerce of the United States at Atlantic City, N. J., April 30.*

Broad Aspects of Industrial Planning Discussed by Taylor Society

BUSINESS planning, not only for operations within a single plant or a single industry, but also in the broader fields of national and even international economics, was discussed before 500 business executives, industrial engineers, bankers, economists and educators at the spring meeting of the Taylor Society at Hotel Benjamin Franklin, Philadelphia, April 30 and May 1.

One session was devoted to consideration of ways in which it might be possible for members of an industry to schedule manufacturing and other operations with a view to avoiding the present situation of overproduction. At another session production systems that have proved successful were outlined. International cooperation for industrial planning was urged by three prominent European economists at a dinner meeting.

Planning for an Entire Industry

Stabilization of any industry can only be effected by considering industrial and economic conditions throughout the country as well as the distribution of the products of the particular industry involved, said R. J. McFall, chief statistician for distribution, Bureau of the Census, Department of Commerce, Washington, in an address on "Planning for an Entire Industry."

Present planning methods are inadequate, as the present business depression indicates, continued Mr. McFall. Statistical knowledge is needed, but it must be broad in scope. The speaker pointed out that statistics of distribution of the products of the automobile industry alone would be of small value to that industry if the general buying power of the public were not considered as well.

Overproduction and under-consumption, alike, are disastrous to industry. Oversupply of labor is more serious than oversupply of machinery, for in the former instance, unemployment results in a decrease in the buying power of the public and a corresponding under-consumption.

Overproduction, in general, is potential rather than actual, Mr. McFall pointed out. Except for agriculture, industries are usually careful to limit production to meet actual demands. There are no exact facts available on the degree of over-capacity of productive equipment or, in other words, of potential overproduction. The reason for the difficulty of obtaining such facts is that much idle equipment is obsolescent and, of course, should not count equally with modern machines in a census of unused productive capacity.

Need Balance Between Mass Production and Hand Work

In the speaker's opinion, the spending power of the public must be maintained, although it seems impossible at present to do this by establishing shorter working hours at higher wages. What is needed is a balance between the mass production industries and industries requiring a maximum of skilled handiwork. The latter, in general, produces so-called luxury products. If "saved labor" released by the growth of mass production methods, could be diverted to the industries employing a maximum of skilled hand workers, a balance would be effected; the one type of manufacturer would serve as the complement of the other. As a result, labor would be at a premium, as it should be.

Acquiring broad knowledge of the distribution of products will be effective in aiding the business world toward stability, said Mr. McFall. Such statistical information, covering the products of many industries, will facilitate planning for a balance between capacity and consumption.

Urges Continuance of Anti-Trust Laws

Continuance of the Federal anti-trust laws was urged by Huston Thompson, of Bright, Thompson, Hindrichs & Warren, Washington, and a former member of the Federal Trade Commission. "Economic concentration is death," declared Mr. Thompson, who said that such concentration, which would close the door to human endeavor, is only avoided by enforcement of the anti-trust legislation.

Mr. Thompson considered it impossible, however, for the Federal Trade Commission to "rule in advance" on the legality of mergers and other corporation transactions. Pointing out that there are some 200,000 corporations doing an interstate business in this country and that many of them desire Federal decisions on one or more questions, the speaker declared that intolerable business delays would result were it customary to await decisions of the Federal Trade Commission before going ahead with contemplated changes.

As a step toward obviating the dangers of economic concentration, Mr. Thompson urged that "when a sale of securities of those doing interstate business is to take place, a statement shall be filed with the Federal Government, stating the amount of bonuses, commissions, etc., that are to be paid from the sale of a stock or bond issue and the amount that is to be invested in the capital or the business." He also advocated that a summary of these facts be included in all advertisements of the sale of securities. Laws to this effect exist in England, Belgium and other countries, it was said.

A plea for the reconstruction of our patent laws was also made by Mr. Thompson, who favored a limit on the length of time during which a patent could be held without being used. Lack of such a limit placed a handicap on our chemical industries during the World War, it was pointed out.

Mr. Thompson concluded by stating that an international trade tribunal would be effective in promoting stabilized economic conditions. Such a tribunal could be arranged, he said, without infringing national sovereignty.

Methods for the stabilization of business also were suggested by Walker D. Hines, director, Cotton Textile Institute, New York, who used the cotton industry to illustrate his discussion.

Binding agreements to balance production with demand would not, in Mr.

Hines' opinion, violate "restraint of trade" laws, as these agreements would not restrict, but rather would promote, trade. "How can it be," he asked, "that even a positive agreement to plan and effectuate such a simple and elementary form of stabilization as balancing production with demand in an industry badly out of balance can properly be regarded as an agreement in restraint of trade?

"If there ever was a time when artificial and fragmentary rules could be applied with the result that an agreement to balance production with demand would be condemned without regard to the need for stability, that time is past," said Mr. Hines. "We now are justified in asking both administrative and judicial agencies to consider, in the light of present-day realities, whether an undertaking for rational planning for the avoidance of overproduction shall be regarded as an agreement in restraint of trade on the one hand, or as an agreement in promotion of trade on the other."

Planning Machinery Production

Ralph E. Flanders, manager, Jones & Lamson Machine Co., Springfield, Vt., was the principal speaker at a session devoted to production planning methods.

A modified form of continuous line assembly is in operation at the Jones & Lamson shops, sub-assembly and final assembly of machine tools being conducted on trucks moved by hand as the work progresses down one side of the main shop building. Storage racks are provided at the opposite side of the building. Parts are machined in a group of shops in the center and an inspection floor is located between the production machines and the assembly line.

Production of completed machines is scheduled on a two-month basis, the number of units of each model being carefully estimated by revision of past records with current orders and demand trends. A reserve of parts is maintained and replenished as needed by a system of lot manufacture. There is a file of cards, one for each part required, which give starting dates on which manufacture of the part must begin in order to have a sufficient quantity available to proceed with assembly in accordance with the schedule of the two-month planning interval. Each card also contains a space in which is noted the quantity of the part required for one completed lathe and the total quantity which will be needed during the assembly period.

The starting dates for the manufacture of parts are also on a two-month basis except for parts which are produced by the automatic screw machine department. For the latter, in order to provide sufficient quantities of each lot for economical runs, the scheduling covers a three-month period with proper adjustment to conform with the shorter scheduling interval of the other departments and the final assembly.

A minimum of inter-shop communication is needed; in fact, Mr. Flanders stated that telephones were unnecessary and had been removed from the shops. Although the program method of parts manufacture, as employed at the Jones & Lamson plant, results in a somewhat higher inventory of parts awaiting assembly than would the strictly lot method of manufacture, Mr. Flanders indicated that the advantage of the former method, in permitting continuous assembly, outweighed the higher inventory.

Production Planning at Textile Machinery Plant

A concrete case of production planning was demonstrated to a group of society members while visiting the plant of Procter & Schwartz, Inc., Philadelphia, manufacturers of hosiery dryers and other textile machinery. The group was conducted through the plant by George B. Whitehead, assistant works manager.

The planning department operates under a modified Taylor system. There is a permanent routing card for each part manufactured, as well as time, inspection and identification tickets for each job. These latter are made out by the central planning department and serve the customary purposes. Slips placed on hooks and in pockets of a control board give instant information at all times of work on the machines and awaiting production. An interesting part of the system is a central illuminated indicating board bearing the numbers of each machine on the floor. As an operator is about to complete a job he snaps a switch at his machine which flashes a red light on the central board opposite the number of the machine. A duplicate of the indicating board is located in the planning office so that the clerks may prepare a new job ticket for the operator.

A paper on budgetary control and cost accounting by Floyd F. Hovey, industrial economy department, Eastman Kodak Co., Rochester N. Y., featured another session.

Planning labor relations was discussed at a group meeting, further consideration being given to the report of the society's committee on an industrial employment code. Covering broad ideals of employer-employee relations and the fundamental objectives of all industrial enterprise, the code includes such topics as wages, working hours, security of employment, personnel administration, shop safety, health conditions, age limits and employment records.

Industrial planning in its larger phases of international relationships was urged by speakers from Great Britain, Holland and Switzerland at a dinner meeting of the society.

Pointing out that, from the standpoint of material needs, the world is now better able to supply what is required than ever before, Major Lynn Urwick, director, International Management Institute, said that "at the same time the mechanisms, by which goods and services are distributed, and particularly the mechanisms of money and financing which provide the medium of exchange between civilized peoples, would not appear to have kept pace with technological advance on the side of production.

"But suppose there was created an international planning department, properly equipped to do its work from the scientific standpoint. Imagine it organized, not along national lines emphasizing national differences, but industry by industry and function by function. Picture it as a clearing house of statistics of vital importance to business."

James A. Bowie, department of industrial administration, College of Technology, Manchester, England, and principal-elect, new Scottish School of Economics, Dundee, urged a "student attitude" toward business problems. One of the means of furthering international business cooperation, he declared, would be a freer interchange of thought between the people of different nations.

The third European speaker, C. H. van der Leeuw, president, International Industrial Relations Association, The Hague, spoke of the congress on social economic planning which this association is sponsoring at Amsterdam next August. The congress will discuss the necessity of planned adjustment of productive capacity and standards of living.

Prof. J. F. Ebersole, of the Graduate School of Business Administration, Harvard University, who also spoke at the dinner, indicated that a lack of sympathy for business planning on a national scale is evident in this country. We are, however, in the "thought" or academic stage of national planning, he said.

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Newton Steel Co. has closed its district sales office at 1 East Forty-second Street, New York. F. C. Flood, district sales manager, will continue to be in charge of sales for the district, but will transfer his headquarters to the general offices of the Eastern district at 1816 Union Trust Building, Cleveland. He will be associated with D. H. McVay, Eastern manager of sales, at that same address. H. M. Pierce is now associated with the Detroit office, Fisher Building. J. Fred Mehlhope is now with the Chicago district sales office at 724 Straus Building.

WHO PAYS FOR NEW EQUIPMENT?

IT is fashionable to economize nowadays. But, like every accomplishment, the practice of true economy is an art. It does not mean merely padlocking the pocketbook.

Take the case of the man who defers having his shoes resoled, although he has the money to pay for the work. He goes out in the rain, gets his feet wet, catches cold, loses several days of work and pays a doctor's bill. False economy!

Or take the man who has a house full of valuable furnishings and whose roof needs repairing. He postpones buying the shingles until "times get better." Down comes the rain and the damage to his ceilings and furniture amounts to a hundred times the cost of patching the roof.

"What peculiar ideas of economy!" you say. But not more peculiar than some of the things that intelligent industrial executives are doing today.

What about the boards of directors and executives in industrial plants that are postponing the replacement of out-of-date equipment until times get better, even when they know that modern machinery and equipment will effect substantial savings?

Suppose times should not get better? Which will be in the better position to make money on what business there is, the concern that sticks to its obsolete equipment, or the one that reequips on a low-cost level?

True economy means saving. Where else can the manufacturer save more advantageously than in his cost of production?

It is false economy to save, for a time, a few thousand dollars in interest charges by postponing the purchase of superior equipment and lose, thereby, the many thousands represented in higher costs.

Especially is this true when you consider that the man who buys improved equipment does not have to pay for it. His less enterprising competitor foots the bill.

In spite of "hard times" and "overcapacity," new plants are being built in many branches of our industry. Equipped with superior machinery, these new plants will not suffer because of overcapacity. Their low cost operating levels will draw plenty of business from higher cost-level competitors.

Cost reduction is always true economy. It will result in real saving; perhaps the saving of your business!

By
JOHN H. VAN DEVENTER
Industrial Consultant
The Iron Age

Copies of this insert may be secured from the Reader Service Department of The Iron Age, 239 West 39th Street, New York.

Previous recent editorials on the subject of replacement:

"Machinery Needs a Friend," The Iron Age, March 12, 1931.
"Depressions Uncover Obsolescence," The Iron Age, March 19, 1931.
"One Word Costs Billions," The Iron Age, April 9, 1931.
"How to Win This War," The Iron Age, April 16, 1931.
"How Bankers Regard Equipment Loans," The Iron Age, April 23, 1931.
"To Him Who Hath," The Iron Age, April 30, 1931.

Development of New Markets Urged by Sheet and Strip Manufacturers

DEVELOPMENT of new markets for steel, with particular emphasis laid on the possibilities offered by the building industry was one of the principal topics discussed by the National Association of Flat Rolled Steel Manufacturers at its annual convention held last week at White Sulphur Springs, W. Va. Attention was also given to the current business situation and methods were considered by which makers of sheet and strip steel may take advantage of what George H. Charls, president of the association, termed "the tremendous stored-up demand" which has been induced by underconsumption.

Mr. Charls urged the members of the organization to take advantage of past experience and past mistakes in meeting present problems. He advocated the maintenance of wages in order to preserve buying power in the consuming industries. In discussing the present destructive competition in the industry, which has reduced prices on flat rolled steel products by about 17 per cent in less than two years, Mr. Charls suggested a remedy in the accurate gaging of consumption and production by each individual unit in the industry.

Market Extension Accomplished

Progress which flat rolled steel manufacturers have already made in extending their markets was graphically illustrated by two charts prepared by the association, comparing production of sheet and strip steel in 1924, the year in which cooperative trade extension work was started, with production in 1929 and 1930, the high and low years in steel output since that time, as against the trend in five major consuming industries. Taking 1924 as a base, sheet and strip production in 1929 showed an increase of 83 per cent, while activity in consuming industries considered showed increases as follows: Farm operations, 6 per cent; automobile production, 50 per cent; building, 7 per cent; railroad maintenance, 1.2 per cent, and total railroad expenditures, 1.2 per cent. In the depression year 1930, sheet and steel production was still able to maintain a 23 per cent lead over 1924, while the consuming industries under consideration reflected decreases amounting to 8 per cent in farm operations, 6 per cent in automobile production, 27 per cent in building, 15 per cent in railroad maintenance and 12 per cent in total railroad expenditures.

As pointed out at the meeting, the above figures indicate conclusively that the sheet and strip business is by no means entirely dependent on these major consuming industries. They may continue as large tonnage buyers, but in the automotive and railroad fields not much further development may be possible. The market studies of the association show that the most important recent growth and future increase in outlets for sheet and strip steel lies in miscellaneous products and industries that didn't exist 10 years ago.

Advertising Program Outlined

In seeking potential new markets for flat rolled steel products, the association has conducted an intensive survey over the last two and a half years with an intensive advertising campaign in view, which was summarized by C. L. Eshleman, president, Griswold-Eshleman Co., Cleveland advertising agency. Mr. Eshleman explained the national educational program now under way in an effort to create a more ready acceptance of steel or to break down consumer resistance, which, according to fabricators of steel products, accounts for from 50 to 80 per cent of their sales effort.

Enumerating the various forms of competition now being encountered by the steel industry, Mr. Eshleman first cited competition within the industry, which does not create a wider market for steel nor develop greater tonnage. He also mentioned competition from other basic products, such as copper, aluminum, wood and cement, makers of which are conducting intensive campaigns to broaden their markets. Competition of synthetic products is also important, particularly in periods of stress. Another obstacle facing steel makers is the overcoming of habit on the part of the consuming public, which is doing more to hold back the acceptance of steel than some forms of real competition. There is also the necessity of recognizing the constantly changing market, which calls for ceaseless advertising by any industry which values new buyers.

Fabricators Aid Market Development

The part played by fabricators in development of new markets for steel was brought out by C. I. Auten, vice-president, Truscon Steel Co., Youngstown, in urging steel manufacturers to seek markets in the building industry. "Unfortunately," Mr. Auten said, "records are not available covering the consumption of flat steel products by industries prior to 1925. However, it must be admitted that the development of the automotive industry swept the sheet and strip mills along with it to prosperity and profit. What was happening to the building industry while this was taking place? Building permits, plotted side by side with automobile sales, follow almost parallel lines. Unfortunately for the flat steel business, man was not taught in his formative period to build with steel. To conquer his predilections, the industry must keep on selling the thought, 'Build with Steel.'

"Fortunately for the steel mills," Mr. Auten went on, "engineers and manufacturers who recognized the inherent qualities of flat steel, began to back their ideas, and since 1925 the building industry has been absorbing almost as much steel as the automotive. Metal lath has almost entirely displaced wood lath; metal windows are quite universally accepted where wood was formerly used. For years windows have been supported by masonry spandrel walls. Offered today is a unit combining window and heating recesses, its base at the floor level, its head beneath the spandrel beam above, thus eliminating the masonry below the sill and providing, in the space formerly occupied by 9, 12 or 18 in. of masonry, a recess, walled with insulated steel for the housing of the radiator and air conditioning units. Thus 20 lb. of sheet steel is added to every window opening.

"Some five years ago fabricators began thinking about the use of flat steel for roof decking. In the period since then, from 20,000 to 25,000 tons of flat steel per year has been consumed by the building industry for this purpose. This is a new outlet for steel in no way replacing steel in any other form, but merely bringing more tonnage to the sheet mills."

Urges More Investment in Selling

In urging steel manufacturers to spend more money in trying to develop new markets, Mr. Auten pointed out that an analysis of the sales cost of the fabricators of sheet steel de-

velops the fact that 20c. of their market dollar is spent in selling. A similar analysis of the sales cost of steel mills shows that it is not more than 1½c. of their sales dollar.

The same analysis shows that in the last five years steel mills have been making 2.6 lb. of sheet steel per sq. ft. of floor area in all buildings. By adding a steel floor here, a steel roof deck there and a few steel partitions this consumption may be increased to 5 lb. per sq. ft. and the business doubled.

"Build within this organization," Mr. Auten continued, "a research department; employ men with engineering training and knowledge of steel. Equip these men so they can work with the fabricators who will manufacture the finished product. Leading architects and engineers throughout the country are visualizing buildings of steel. Three inches saved in the thickness of each floor in a 40-story building means another complete floor without additional height and a decreased unit cost, resulting in increased revenue. Steel in a new form or combination is the only material with which these results can be accomplished. Advertising can only ring the doorbell to this market and manufacturers must furnish all possible support."

Architects Passive to Steel

In outlining the results of an investigation recently conducted in the Chicago district to determine the possibilities of enlarging the use of flat steel in building, F. C. Gifford, vice-president, Acme Steel Co., Chicago, stated that architects were generally unfamiliar with the possibilities of steel for such purposes. On the other hand, fabricators, such as makers of steel doors, windows, lath and other building products, showed great interest in developing these markets. Serious competition, Mr. Gifford pointed out, is being offered by makers of other metals who have gone to great lengths in convincing architects of the possibilities offered by their products in the building field.

Mr. Gifford joined Mr. Auten in a plea for field engineers to be employed by the steel industry to help develop markets in the building industry, and it is not unlikely that this discussion at the convention will influence the association to take experimental steps in this direction in the near future.

Oppose Wage Cuts

Maintenance of present wage scales in the steel industry was advocated by a number of the executives present, particularly by John C. Williams, president, Weirton Steel Co., Weirton, W. Va. Mr. Williams pointed out that wages in the industry were not inflated in the recent periods of prosperity and that any cut now would not bring material reduction in the cost of steel manufacture. It would also probably be passed on immediately in the form of lower prices to the consumer and leave the steel industry in the same position as before.

E. P. Thomas, vice-president, United States Steel Corpn., New York, in voicing opposition to wage cuts, also pleaded for better maintenance of selling prices for flat rolled steel. He stated that there would be little use for the association to go on with its work of developing new markets for steel products if the industry continued to sell at cost or less than cost. Trade association work, according to Mr. Thomas, has reached a crisis and all cooperative activity in industry is useless if manufacturers continue to operate their businesses at a loss.

Government Wants to Cooperate

Stressing the fact that the Federal Trade Commission believes that the most effective way to prevent unfair competition is in cooperation with honest business, W. E. Humphrey, Federal Trade Commissioner, Washington, told the members of the association that the trade practice conference is still an important part of the Government's present policy of cooperation with business.

"One of the most effective ways to protect the public and the honest competitor," said Mr. Humphrey, "is for the commission to help business help itself, to free itself of any unfair and misleading practice. The trade practice conference may be defined as a method of cooperation of the commission within an industry as a whole to clear its own house. It is a method whereby industry may voluntarily achieve decency rather than by having decency thrust upon it through litigation."

Commission Cannot Change Rules

In explaining certain suggested changes in some of the trade practice rules heretofore approved by the commission, Mr. Humphrey emphasized the fact that the Federal Trade Commission has no power to change any rule of any industry. "The commission can only suggest changes and it is for the industry concerned to say whether it will accept such changes. Some confusion and apprehension and criticism had arisen about certain rules that we had heretofore approved. The commission from a legal standpoint had made some mistakes in approving certain rules and did not attempt to escape responsibility. As soon as the commission became satisfied of the fact, it immediately set to work to correct the error and correct the evil that had been done. It has been asserted that the reason the commission did this was because it had changed its policy toward industry. That is not true. It has also been stated that the President and the Attorney General caused this change in the policy of the commission. This is also an error. The commission never received any suggestion or intimation from the White House or the Department of Justice about changing the trade practice conference rules. The commission acted in this matter entirely upon its own volition and on its own responsibility. To it belongs the blame or credit, if any there be."

Mr. Humphrey took the occasion to reply to certain statements made recently by Prof. William Z. Ripley in attacking the Federal Trade Commission. In reply to the latter's statement that the main activity of the commission seemed to be "the drafting of codes of business ethics for second-hand bottle dealers and other equally basic industries," Mr. Humphrey cited the work which had been done in the grocery industry, among petroleum producers, in the structural steel field, among the fur wholesalers and the periodical publishers and in many other important industries.

Legislation No Cure for Depression

In commenting upon the depressed state of business, Mr. Humphrey stated that the depression will "not be cured by raids upon the national treasury. In times of stress like these," he said, "we are prone to forget the fundamental fact that the Government is a beggar, is a pauper; that it does not have and cannot have a dollar except what is given to it; that all money taken out of the national treasury is taken out of the pockets of the people; that all indebtedness of the Government must be paid by the people. The situation cannot be cured by letting the Government run the business of the country. It cannot be cured by the dole. Dole dwarfs the soul of self-respecting labor. It cannot be cured by encouraging incompetency or idleness. It cannot be cured by legislation."

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Machine Shop Course

A machine shop training program has been developed by the American Machinery and Tools Institute, Chicago, in cooperation with the Lewis Institute. Applicants must be high school graduates or have had sufficient industrial experience to provide a good general educational foundation. The training period covers two years of 40 hr. a week, much of which will be devoted to operating the various machines on a shop production basis. Completion of the training and the instruction given by the Lewis Institute and one year of satisfactory service in a shop affiliated with the machinery and tools institute earns for the candidate the title of associate in mechanic arts. This title is said to indicate the completion of two years of college work in engineering beyond the high school level, and to recognize him as a skilled workman in the machinery and tool industries. Details of the course may be obtained from G. R. Tuthill, executive secretary American Machinery and Tools Institute, 40 North Wells Street, Chicago.

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BETHLEHEM BECOMES LARGEST FABRICATOR

ACQUISITION by Bethlehem Steel of three additional structural fabricating plants, announced elsewhere in this issue, puts this company at the top of the list of steel fabricators, in terms of capacity. The additional facilities with previous ones now give Bethlehem an annual capacity of about 1,100,000 tons of fabricated steel.

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CHRONIC AND TRANSITORY OVERPRODUCTION

G. CARROLL TODD, former assistant to United States Attorney General, at annual meeting of U. S. Chamber of Commerce, distinguishes between "chronic" overproduction, such as exists in the exploitation of oil and other natural resources, and "transitory" overproduction, due to a temporary lack of balance between supply and demand. He suggests that amendment to anti-trust laws may be a feasible means of relieving the chronic cases by securing regulation of output.

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CONFUSION OF PROPHETS

"WHILE prophecy in reasonable doses may be good for us, we run the risk of mental dispepsia when we listen too trustingly," said Fred M. Sargent, president, Chicago & North Western Railway, at the Atlantic City meeting of the U. S. C. of C. Referring to the great diversity of opinions expressed by economists, Mr. Sargent said that he had a mind to gather them all together into a volume called a "Bibliography of Scientific Disagreement."

Nowadays, long-term forecasts are safer than short-term ones. They are not so quickly susceptible to disproof by events.

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BRITISH HOPEFUL

FEDERATION of British Industries, in view of the perceptible improvement in business during the past quarter, believes that the worst of the depression is over. Budget balancing has helped business sentiment, and the recent movement to modify the "dole" is also encouraging.

Next move of British industry will be toward cost reduction as a means of recovering export trade. Experts figure that an average cost reduction of 30 per cent will put Great Britain's industries in favorable competitive position. This will mean replacing much of the existing equipment.

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THE LOW POINT

ERNEST T. WEIR, chairman of National Steel Corpn., says that the steel industry has seen its low point. E. G. Grace says that there are no signs of an early pick-up, but that the present rate will probably be sustained. Holding the line is a large part of winning the game later on.

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MOTOR OUTPUT HOLDS

APRIL output of motor cars in U. S. and Canada is estimated to be between 330,000 and 350,000 units. Prospects are that May will hold up to the same rate. Chevrolet is the industry's brightest spot at present.

SIX CENTS PER SHARE

BETHLEHEM announces its first quarter earnings as representing six cents per share on the common stock, virtually the same rate of earnings as was announced by United States Steel Corpn. the week previous for the same period. Both companies could probably have made larger earnings if they had not chosen to protect the wage rates and jobs of their employees. But the investment in good will may return them larger dividends later on.

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EXPORTS SHRINK

MARCH exports of machinery were 33.15 per cent under those of February, and the smallest for any month since October, 1926. Forging machinery was one of the exceptions, the March figures not only exceeding the previous month's, but substantially beating the 1930 first quarter monthly average. Sheet and plate metal-working machines, while not coming up to the February export dollar volume, also exceeded the first quarter monthly average for 1930.

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NOT SO BAD!

STATISTICS of steel ingot and steel casting production, reported by the American Iron and Steel Institute for 1930 in this issue, reveal a drop of approximately 28 per cent from the 1929 peak. Ingot and rolled iron and steel production, in 1930 was back to the 1924 level, and steel casting output corresponded with that of 1922. The depression in 1930 set ingot production back six years. Compare this with the 13-year setback to ingot production in the depression year of 1921.

Low Point Reached in Steel, Says E. T. Weir

Belief that the steel industry in general has seen its low point and is beginning in a small way to mend was expressed last Friday by Ernest T. Weir, chairman of National Steel Corpn., prior to sailing for Cherbourg on the Europa.

"Improvement in consumption is still small, but it is on the increase. Some very large consuming interests have recently expressed their confidence that the low point in general business has been passed.

"The low earnings of the steel companies in no way justify a reduction in wages. Any reductions would probably merely be passed along in the form of lower prices. Large buyers of steel are entirely satisfied with prices, which means that they are as low as is necessary to stimulate competition. Our largest customers are all opposed to wage cuts, even though they would result in lower steel prices," Mr. Weir said.

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Bethlehem Earnings in Quarter 6c. on Common

The Bethlehem Steel Corpn. earned 6c. a share on its common stock in the first quarter, after deducting all charges and dividends on the preferred stock. This compares with 17c. a share in the final quarter of 1930 and with $2.60 a share in the first quarter of last year.

A reduction in the quarterly dividend on the common stock from $1.50 to $1 a share was voted by the board of directors at its meeting April 30. The regular dividend on the preferred stock was declared.

Total income of the corporation for the quarter was $7,551,977, compared with $7,418,383 in the preceding quarter, but interest charges and the provision for depreciation were higher, partly because of the acquisition of the McClintic-Marshall Corpn.

Operations of steel mills averaged 50.8 per cent of capacity during the first quarter, compared with 42.5 per cent during the previous quarter and 80.8 per cent during the first quarter of 1930. Current operations are at approximately 48 per cent of capacity, with incoming orders barely sufficient to maintain this rate, it was stated by President E. G. Grace.

Mr. Grace added that he saw no signs of an early pick-up in steel business, but he thought that there will be no appreciable falling off from the present rate of activity. New orders declined during April.

Bethlehem's average billing prices for steel in the first quarter were slightly above those of the previous quarter, but despite this fact and the further fact that its output was higher in the past quarter, net earnings declined. Mr. Grace said this might be partly explained by first-of-the-year adjustments on inventories.

Answering various questions submitted to him, Mr. Grace said that the change in the financial affairs of Cyrus S. Eaton had resulted in no agreement, so far as he knows, regarding the suit involving the Youngstown Sheet & Tube Co., that no offer for the sale of the Republic Steel Corpn. has been made either by the Republic management or by Bethlehem, and that Bethlehem is still maintaining basic wage rates in its plants. To satisfy an inquirer's curiosity as to Bethlehem's participation in stainless steel manufacturing, Mr. Grace said that the company has a 20 per cent interest in the American Stainless Steel Co.

Another question had to do with Bethlehem's cash position, which usually is not given out at quarterly periods. Mr. Grace said the amount as of April 1 was $58,582,000, compared with $56,416,812 on Jan. 1.

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General Electric Fails to Earn Common Dividend

Orders received by the General Electric Co. for the first quarter of 1931 amounted to $60,366,297, compared with $90,397,731 for the corresponding period last year, Gerard Swope, president, announced at the annual meeting of stockholders. Sales billed for the first quarter amounted to $61,959,800.90, compared with $91,205,732.28 for the corresponding period last year.

Profit available for dividends on common stock for the quarter was $10,844,334.09, compared with $14,398,790.52 for the same three months last year, which is equivalent to 38c. a share in 1931 and 50c. a share in 1930 on the 28,845,927 shares outstanding in both periods. The quarterly dividend is 40c. a share.

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To Issue Engineering Monographs

A series of technical treatises to be known as Engineering Societies Monographs will be published by the societies' library, 29 West Thirty-ninth Street, New York. They are intended to provide a means for presenting manuscripts of too specialized a character for publication in book form and yet too extensive for use in periodicals or proceedings of engineering societies.

The first of these monographs will be by Dr. A. Nadai, research laboratories, Westinghouse Electric & Mfg. Co. It is to be a revised translation of the author's treatise in German on "Plasticity."

"Business Interruption" Insurance Discussed

"Keen competition makes it essential that business be continued with as little loss from interruption and casualties as possible," said P. D. Betterley, assistant treasurer, Graton & Knight Co., Worcester Mass., in an address on "Use and Occupancy Insurance" at the insurance conference of the American Management Association, held at the Palmer House, Chicago, April 27-29. One method of providing capital to maintain organization, meet obligations and restore early production is to carry "business interruption" insurance, he stated.

Inasmuch as this insurance does not relate to ownership of property, the common title, "use and occupancy" was said to be somewhat misleading, for losses may occur through interruptions that do not involve either the use or occupancy of premises. There are insurable hazards without any property damage, such as the interruption in power supply, in delivery of materials or service which is essential to production. The loss is not one of income already made, but prospective earnings, and many casualties which cause a suspension of, or reduction in, earning power, may be considered interruption hazards.

"The need of 'use and occupancy' insurance for specific hazards can only be determined after a careful analysis," Mr. Betterley said. "There are often means of prevention which will diminish the hazard, but if the risk is relatively great, it may be more economical to insure. Fire is the most common and serious cause of loss. Windstorm, explosion, earthquakes, flood, public utilities service interruption and curtailed source of materials are less frequent but may result in severe damage."

The extent of the interruption was considered carefully. "The effects of casualty depend upon its origin, the section of the premises disabled, the activities curtailed and facilities for restoration. There are vital spots where a greater shutdown loss may occur than in other sections, and certain processes entail more effort to restore."

Discussing the form of policy that should be used, Mr. Betterley recommended that insured values be the gross earnings from operations, less the portions of all expenses which would not continue during an average shutdown period. "This ought to meet the buyer's objections to paying on a full year's valuation and eliminates the danger of under-insurance due to forgotten items," the speaker added.

Catastrophe hazards, products liability insurance and stabilizing a business enterprise through life insurance were other subjects discussed at this three-day insurance conference.

Bethlehem Buys Three Fabricating Plants

The Bethlehem Steel Corpn. has acquired the structural steel fabricating plants and businesses of the Hay Foundry & Iron Works, the Levering & Garrigues Co. and the Hedden Iron Construction Co., it was announced on April 30 by President E. G. Grace of Bethlehem. These companies have plants in New Jersey, closely adjacent to New York. The businesses will be consolidated with the McClintic-Marshall Corpn., which Bethlehem acquired a few months ago.

With these companies, the Bethlehem Steel Corpn. will have about 1,100,000 tons annually of structural steel fabricating capacity. The three companies above mentioned have a total of about 180,000 tons, the McClintic-Marshall Corpn. had about 700,000 tons, and the remainder consists of structural shops at Bethlehem mills.

During the last few months it has been reported that Bethlehem was negotiating for other fabricating companies in the East, but Mr. Grace stated that no further negotiations are now in progress, and that Bethlehem probably has sufficient fabricating capacity, but that offers of other companies would receive consideration. Bethlehem's capacity in fabricating structural steel now exceeds that of the American Bridge Co. by about 400,000 tons.

No announcement has been made as to consolidation of offices or of changes in personnel that are expected to follow the acquisition of the Hay, Levering & Garrigues and Hedden companies.

Purchase of these companies was effected without an exchange of stock and without new financing. Mr. Grace did not disclose the basis of purchase, but said the properties are to be paid for with cash and short-term securities.

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Steel Institute Program for May Meeting

At the morning and afternoon sessions of the thirty-ninth general meeting of the American Iron and Steel Institute which will be held at the Hotel Commodore, New York, on Friday, May 22, the following technical papers will be presented:

"Cooperative Research in the Iron and Steel Industry," by F. N. Speller, director, department of metallurgy and research, National Tube Co., Pittsburgh.

"Shipbuilding and Its Relation to the Steel Industry," by H. Gerrish Smith, vice-president, Bethlehem Shipbuilding Corpn., Ltd., New York.

"An Appraisal of Nitriding," by Marcus A. Grossmann, vice-president, Republic Research Corpn., Massillon, Ohio.

"A Thermal Study of an Open-Hearth Furnace," by William M. Henry, chief engineer, Newburgh Works, American Steel & Wire Co., Cleveland, and Thomas J. McLoughlin, fuel engineer, Duquesne Works, Carnegie Steel Co., Duquesne, Pa.

"Corrosion-Resistant Alloys of the Stainless Type in Use and Fabrication," by T. Holland Nelson, consulting metallurgist, Midvale Co., Philadelphia.

"A Review of Certain Gas Producer Practice," by Victor Windett, manager, gas producer division, Wellman Engineering Co., Cleveland.

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Scrap Classifications of Railroads Studied

The railroad scrap committee of the Institute of Scrap Iron and Steel, Inc., 11 West Forty-second Street, New York, has completed a study of railroad scrap classifications and contracts governing the sale of scrap by railroads, and has written to C. E. Walsh, purchasing agent of the Pennsylvania Railroad and chairman of the purchases and stores committee of the American Railway Association, suggesting the appointment of a committee by his division to meet with the railroad scrap committee and to receive its report. This committee, of which Frank Parker, Chicago, is chairman, has made several suggestions at the invitation of the purchases and stores division to clarify a few of the 45 scrap specifications in the A. R. A. classification. In addition, the committee has made suggestions with reference to the time of delivery, shipping instructions, shortages, net ton and gross ton bases, weights to govern, minimum carload and other items in scrap contracts.

The recommendations include the experiences of the scrap iron dealers over a number of years, as well as the recommendations of Benjamin Schwartz, director general of the scrap institute, growing out of his national survey of the relations of the railroad with the scrap iron industry. It was the aim of the committee, in making its suggestions, to clarify some of the specifications, remove misunderstandings and assure the railroads of the highest financial return for their scrap materials.

The question whether the railroads are securing the best financial results from the preparation of their own scrap was also discussed by the committee. It was pointed out that many consumers who formerly used a great quantity of No. 1 heavy melting steel are increasing their uses of lighter scrap materials, in their efforts to reduce costs, and that this tendency will have to be considered by the railroads in determining their scrap marketing policies. It was the consensus of opinion in the committee that the best interests of the railroads are served by preserving open scrap markets and by disposing of their scrap materials through the agency of the scrap dealer, who is prepared and equipped to adjust himself to the various market conditions and economic trends in the industry.

Western Electric Scrap Brings $8,000,000 in Year

Scrap reclaimed at the Western Electric Co.'s Hawthorne works, Chicago, last year was valued at more than $8,000,000. Cable, which is discarded from telephone service, is the largest single item. Among the various classifications of scrap reclaimed are iron, steel, rubber, wood, paper, chemicals, paints, sawdust, wire, felt, slate, mica, rosin, thread, wax, and several of the precious metals.

A large percentage of the copper reclaimed is reused in the manufacture of new cable. Copper which has been debased so as to be unsuitable for this purpose is shipped to outside refineries. Rubber shavings that cannot be reduced to powder again are sold to manufacturers of bowling balls. Some kinds of switchboard wires are dipped in paraffin and sold for use in radio receiving sets. Scraps of metal in odd shapes and sizes are used by toy manufacturers. Bakers eagerly seek the wooden lags that are nailed over the cable reels because they produce an even heat when burned in bake ovens. Floor sweepings also are turned into money. All that is combustible is fired in an incinerator, and there are times when the resulting ash has a value as high as $7 a ton.

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Canadian Pig Iron and Steel Output Up in March

Pig iron production in Canada for March reached a total of 57,110 gross tons, a gain of 11 per cent over February, based on the daily rate. The increase was mostly in basic iron.

For the first quarter, production of pig iron amounted to 139,097 tons, a decline of 40 per cent from the 232,261 tons reported for the corresponding quarter of last year.

Production of ferroalloys in March had a slight increase over February, with 4526 tons in March against 4006 tons in the previous month. Output in the first quarter aggregated 12,999 tons, compared with 17,043 tons in the corresponding quarter of 1930.

Production of steel ingots and direct steel castings totaled 99,341 tons in March, which was the third month in succession to show an increase since production fell to its low of 56,101 tons in December last. The daily rate of output for March was 3205 tons, which was 9 per cent greater than the February average of 2951 tons per day.

For the three months ended March 31, production of steel ingots and direct steel castings totaled 239,576 tons, against 339,299 tons in the first quarter of 1930.

Large Reservations for Boston Metal Show

More than 35,000 sq. ft. of exhibit space at the thirteenth National Metal Exposition has already been reserved, according to an announcement from W. H. Eisenman, secretary of the American Society for Steel Treating and director of the exposition. The National Metal Exposition will be held this year in Boston, at the Commonwealth Pier, Sept. 21 to 25.

Floor plans and contracts had been sent only to previous exhibitors at the time of the announcement. The figure is larger by several thousand feet than similar records of the past several years. General distribution of floor plans began April 25.

The congress will have the cooperation of several technical societies in addition to the A. S. S. T. Programs will be sponsored by the iron and steel and the machine shop practice divisions of the American Society of Mechanical Engineers, the institute of metals and the iron and steel divisions of the American Institute of Mining and Metallurgical Engineers, the American Welding Society and the Gas Products Association.

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Hartford Meeting Planned by Mechanical Engineers

Round table discussion of employment stabilization will feature the opening session of the meeting of the American Society of Mechanical Engineers at the Bond Hotel, Hartford, Conn., June 1, 2 and 3. This gathering, the fourth in a series of New England meetings of the society, is being arranged by the Hartford section in cooperation with the other local sections in New England. Other sessions will be devoted to machine shop practice, machine design, aeronautic, textile manufacture and employee-education problems.

"Collapsing Strength of Steel Tubes," by T. McL. Jasper and J. W. W. Sullivan, and "Strength of Thin Cylindrical Shells under External Pressure," by H. E. Saunders and D. W. Windenburg, are papers planned for the afternoon of June 1. In the evening, F. N. Ryan, Bell Telephone Laboratories, New York, will outline developments in radio communication between airplanes and ground.

The performance of cutting fluids will be discussed by C. W. Boston and C. J. Oxford at the first machine shop practice session, Tuesday morning, June 2. Following this, T. G. Digges will tell of studies on the influence of chemical composition and heat treatment of steel forgings on machinability with shallow lathe cuts. Simultaneously, sessions will be held by the power, petroleum, applied mechanics and aeronautic divisions, the last-named to include an outline of aircraft engine development, present and future, by A. V. D. Willgoos.

"Small Tools and Gaging for Interchangeable Manufacture," by E. J. Bryant, and "Conventional Gages and Their Application to Duplicate Manufacturing," by T. F. MacLaren, are papers scheduled for the second machine shop practice meeting on Wednesday morning, June 3. At a simultaneous session, J. A. McCarthy will speak on training foremen to deal with human problems in industry, and Miss Frances Perkins will discuss apprentice and foreman training.

Plant inspection trips on Tuesday afternoon will include visits to the Pratt & Whitney Co. and the Chance-Vought Corpn. plants. On following afternoon the Colt's Patent Fire Arms Mfg. Co. and the Royal Typewriter Co. will be open for inspection. A banquet is planned for Tuesday evening.

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Testing Society to Hold Exhibit in June

For the first time in its history, the American Society for Testing Materials will sponsor an exhibit of testing apparatus and machines in conjunction with the annual meeting of the society at the Stevens Hotel in Chicago, June 22 to 26. The exhibit has been planned with a view to having a distinctly scientific and broadly educational atmosphere which will be consistent with the technical nature of the society's activities.

The exhibit is limited to equipment and apparatus used in the testing of materials and products, and recording and control equipment which is used in testing will be shown. Testing machines of all types, metallographic and optical equipment, certain chemical and physical testing equipment, and specialties will be in the displays of the leading companies in these fields. Manufacturers, distributers, and representatives of foreign companies will have equipment on display covering practically all phases of testing.

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State Highway Work to Cost Billion Dollars

WASHINGTON, May 1.—About a billion dollars will be expended on road construction and maintenance by the various State highway departments in 1931, according to a statement prepared by the American Road Builders' Association.

Facts collected from the State highway departments on actual expenditures for 1930 give a total of $908,070,000. Expenditures estimated for 1931 amount to more than $955,000,000, with a number of State legislatures still in session and road improvement programs before them. This represents a substantial increase in State highway work.

Northwest Metal Trades Meeting at Portland

The twenty-fifth meeting of the United Metal Trades Association of the Pacific Northwest on April 25, at Portland, Ore., brought out a large attendance from the key cities of Oregon and Washington. President O. R. Rabel in his annual report touched on the labor situation, reporting no unusual disturbances during the past year in the trade, and called attention to the cheerful cooperation of labor in meeting changed conditions. In his recommendations for the coming year, he urged budgeting and cooperation on the part of the association and more attention to the welfare of employees and further metals research work.

Secretary F. J. Danaher, in his annual report, urged the members to adopt better methods of distribution. He also recommended the employment of a field manager by the association.

Reporting for the Washington district, Secretary A. H. Garrison urged members to carefully conserve their funds, and yet was of the opinion that the slack period would continue but little longer. While it was noted that orders from the lumber industry had been greatly reduced during the past year, indications point, he said, to an increase from the shipbuilding yards.

C. H. Pape, president of the Oregon district, reported that during the past year employees in the metal industry numbered 33⅓ per cent less than a year ago. Labor troubles during the year were nil. Highway work and harbor improvements were the bright spots on the order books, while pulp and paper mills, silver and copper mines were using small tonnages.

Ray Smythe, Willamette Iron & Steel Co., introduced Dr. A. J. Schleuning, who spoke on "The Political Situation in Russia—Yesterday and Today."

A lengthy discussion by many prominent employers occurred on the wage question. While no resolution was adopted, it was decided that it would be poor policy to decrease wages at this time.

The election of officers resulted in the following being named for the ensuing year: President, C. H. Pape, Independent Foundry Co., Portland; vice-president, Albert Worley, Lidgerwood-Pacific Co., Tacoma; second vice-president, F. C. King, King Brothers Boiler Works, Portland; third vice-president, E. D. Doran, Seattle; treasurer, Heinie C. Forsberg, Portland; secretary, F. J. Danaher, Portland.

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An order for 800 tons of 72-in. steel pipe for the city of Detroit has been placed with Alco Products, Inc., division of American Locomotive Co. The pipe is for a new pumping station for water supply. Delivery is to be made in the summer.

Automobile Industry More Hopeful as May Promises to Equal April

DETROIT, May 4.

MOTOR car output during April in the United States and Canada probably was about 350,000 units, according to estimates from a semi-official source. The Ford Motor Co. has announced that its April output was 117,891 cars, compared with 99,035 in March and 206,340 in April 1930. Ford output in the first four months of this year was 357,217 cars, against 605,661 in the same period last year. With Ford production now made public it seems assured that the April output for the industry was at least 350,000 and possibly 360,000 cars.

The Chevrolet Motor Co. surprised the industry by assembling 106,096 cars, compared with its original schedule of 85,000 cars for April. In fact, Chevrolet just now is the brightest spot in the automotive picture so far as steel mills are concerned. It is understood to have boosted its schedule again in the last few days, thereby necessitating some additional steel orders.

Despite the past week's unfavorable developments in the stock market, which seem to have deepened the gloom in many quarters, the automobile industry refuses to be downhearted. It may be looking at the situation through rose-colored glasses, but it sees ahead of it a May which probably will be the equal of April and may surpass it. Beyond the next 30 days, however, automobile makers hazard few predictions. Nevertheless, they feel far from pessimistic about the outlook during the summer and fall, still clinging to the belief that the last half of the year will outstrip by a comfortable margin the same period in 1930.

Tentative May programs for companies other than Ford indicate little change from April, although in some cases an acceleration of output is contemplated. Thus, the month's relative showing compared with its predecessors depends on what Ford does. There are signs, in the matter of materials releases, pointing to a decline in Ford activities; on the other hand, reliable information about what Ford is doing at the Rouge plant is rigidly guarded and statements of supposed facts about Ford's intentions are at best mere guesses.

In many cases independent automobile companies made a good showing in April. Auburn Automobile Co. shipped 6003 Auburn and Cord cars, setting a new high figure in its history. The total number of units shipped since Jan. 1 is 17,723, which is 4030 more cars than the company built in all of 1930. Unfilled orders on April 30 were understood to be the largest in the company's history. May production is put at more than 6000 cars. Buick last month turned out 13,939 cars, compared with 9601 in April, 1930. Oldsmobile assembled 7574 cars in April, Oakland-Pontiac about 13,000, Graham-Paige 2554, Cadillac 2607, Reo 1023, Hudson about 9000, Hupmobile 3139, Studebaker 7000, Willys-Overland 12,000, Chrysler about 31,000.

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April output of motor cars in United States and Canada estimated at close to 350,000 units. May production probably will be about the same.

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Chevrolet made 106,096 cars in April and has more than 100,000 scheduled for this month. Auburn shipped 6003 cars last month, setting an all-time record. Buick built 13,939 cars in April against 9601 in April, 1930.

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Ford produced 117,891 cars in April, compared with 99,035 in March and 206,340 in April, 1930.

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Chevrolet is employing 35,000 men, working an average of 50 hr. a week. All plants are operating five and a half days a week and some assembly plants six days.

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Chevrolet Still in the Lead

CHEVROLET is reported to be planning a May production of about 100,000 cars. It still is leading all other makes in passenger car registrations throughout the country and of course is doing everything possible to maintain this advantage. Its latest move has been to add a landau phaeton to its line. The Chevrolet foundry at Saginaw is working virtually at capacity as are the assembly, motor and stamping plants at Flint and the gear and axle and forge departments in Detroit. This week the Saginaw foundry is receiving its first water shipment of pig iron since the Lake navigation season opened. This movement from the Hanna furnaces at Buffalo will continue through the summer and fall, when sufficient stock again will be accumulated to carry the plant through the winter. The construction of a dock by Chevrolet adjoining its foundry at Saginaw, coupled with the cleaning of the Saginaw River channel by the War Department, has brought large savings in transportation costs. Pig iron from the nearest Detroit furnace formerly cost Chevrolet $2.10 a ton freight,

whereas today it is brought by boat from Buffalo for little more than the transfer charge in the city of Detroit.

In the matter of water shipments, steel is moving to Detroit from Chicago district mills by boat every week, and steel producers hope to maintain this schedule during the coming months. Some steel has come into Detroit by water from Buffalo and in turn scrap, which has been laid down in a boat here during the past winter, has recently been hauled to Buffalo.

Free Wheeling Gains Predicted

FURTHER speculation regarding the spread of free wheeling has been aroused by the statement of A. R. Erskine, president of the Studebaker Corpn., that by the end of 1932 free wheeling transmissions will be in universal use and that this summer two large independent companies will adopt this device. However, the industry's opinions regarding the advantages of free wheeling are not yet unanimous, as indicated by the president of a well-known motor car company, who declares that he does not approve of the principle and does not intend to put it on new models soon to be announced. Despite this note of criticism, there is no doubt that free wheeling has been an excellent selling point and in many cases has been the major factor in obtaining retail orders. The rapidity with which it has been adopted since its introduction by Studebaker in the summer of 1930 is eloquent testimony that a large part of the industry believes in its worth.

Cadillac Installs New Furnaces

CADILLAC Motor Car Co. has recently installed four new electric rocking arc furnaces in its foundry for the production of brake drums, clutch plates and cylinder blocks. With a capacity of 5000 lb. of molten metal and a daily output of 30 tons each, these furnaces are capable of heating metal to 3000 deg. F., or 300 deg. higher than the maximum possible with ordinary cupolas. This extra temperature is said to insure greater tensile strength and longer life to the metal. The furnaces are lined with andalusite, which is a natural compound with a refractory point of 3500 deg. Incidentally, several prominent motor car companies are devoting considerable attention to the strengthening of brake drums in view of the high speeds at which cars are driven today. The strain of bringing a heavy automobile to a stop from a speed of 60 miles per hr., a not uncommon practice, and the added stress arising from free wheeling, have made this necessary.

The extent to which wood wheels have been replaced by steel, either in wire or disk form, is indicated by the statement of a Detroit automobile wheel company the past week that 87 per cent of the wheels now being produced are all-steel. It probably is difficult to ascertain whether this figure is correct, but it does give a good conception of the sharp swing toward steel wheels. The movement has been accelerated by the use of wire wheels by the Ford and Chevrolet companies.

Few people probably realize that electric passenger automobiles still are being manufactured. It is of more than passing interest, therefore, to note that the Detroit Electric Car Co. is building an electric car with a top speed of 35 miles an hour (with a speed shunt for short periods) to sell at $4,250. Its body reflects the streamline effect so noticeable in most 1931 models and has a slanting windshield. A second body type will be built shortly, and a former model will be continued.

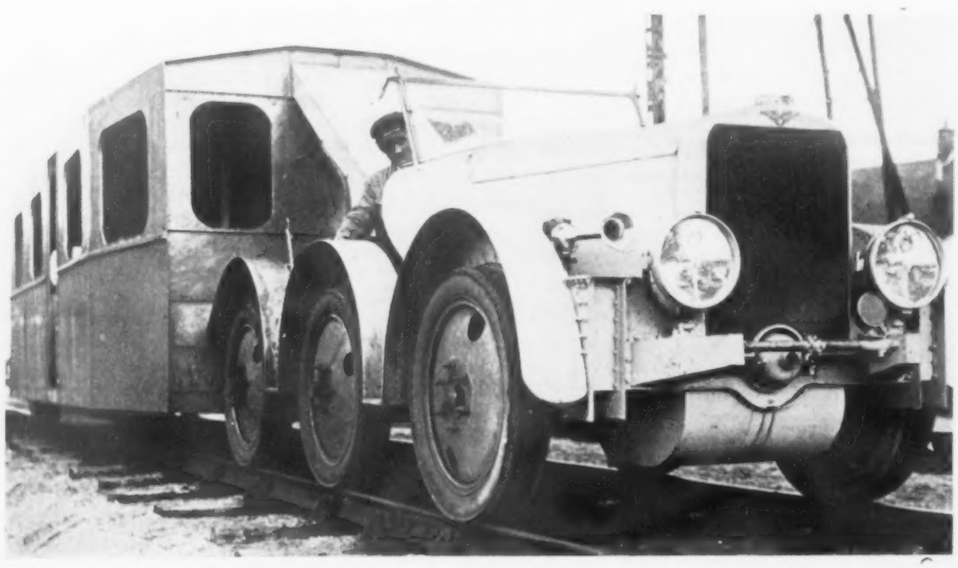
In the next 30 days Reo is expected to announce additions to its line of trucks, extending into both the lower and higher price levels. It is significant that other passenger car companies, including Ford, Chevrolet and Willys-Overland, have gone into truck manufacturing on a larger scale this year. Studebaker and Pierce-Arrow, through the S. P. A. Corpn., have likewise invaded the heavy truck field with considerable success. Mr. Erskine, Studebaker's president, expresses the belief that the proportion of trucks to total automobiles in use will increase substantially in the next few years. This seems assured, as various truck body types are developed, truck prices are lowered and more emphasis is put on quick delivery of merchandise from the manufacturer and wholesaler to the retailer. Truck production since the first of the year has not been promising, although signs of expansion have appeared.

New Cars and Trucks Offered

NEW cars still are being offered to intrigue the buying public. Reo has added a convertible coupe on its 135-in. wheelbase Royale chassis at $2,945. A quality manufacturer will bring out a new line of cars in 30 to 45 days, while a low-priced maker will present new features on its present models. A Detroit company has a new six about ready.

Despite the fact that the autmobile industry is at or near its seasonal peak, the number of unemployed in Detroit is still estimated at 125,000 to 130,000. At the lowest point in motor car activities last winter there were some 175,000 men out of work in this city. It is thought that the pick-up in automobile circles has taken care of about 25,000, the remainder having been absorbed by outdoor seasonal jobs and by the Lake boats when the navigation season opened.

RUBBER-TIRED TRUCKS OPERATE ON RAILS IN FRANCE



RAILROADS in France are experimenting with motor truck transportation on rails. The illustration shows a motor truck with rubber-tired wheels operating on a branch line from Issoudon to St. Florent.

Machine Tool Builder Closes Chicago Branch

Manning, Maxwell & Moore, Inc., 100 East Forty-second Street, New York, has closed its Chicago sales branch and has withdrawn from direct sales representation in that territory for Putnam machine tools and Shaw overhead electric traveling cranes. Manning, Maxwell & Moore will henceforth be represented in Chicago by the Dean Machinery Co., which has been organized by R. S. Dean, who has been connected with Manning, Maxwell & Moore for 22 years, the past few years as manager of the Chicago branch. The Dean Machinery Co. has offices at 80 East Jackson Boulevard, Chicago, and a warehouse at 2601 Cottage Grove Avenue.

The Chicago office of the Consolidated Ashcroft Hancock Co., Inc., a subsidiary of Manning, Maxwell & Moore, will continue to operate without change.

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New Use for Steel in Building Industry

Among recent developments in products that tend to cause an expansion of the use of steel in the building industry is the bringing out of vitreous enameled pressed steel wall tile for bathrooms and kitchens, the refrigeration and dairy industries and other fields.

This tile will be made by the Youngstown Pressed Steel Co., Warren, Ohio, which is installing equipment for enameling the new product, on which it will start production within 90 days. The equipment will include two continuous electric furnaces for burning the enamel.

The tile is in individual pieces and will be made in two standard sizes, 3 x 6 in. and 4½ in. square—the former in 3 x 3-in. sizes for starting broken joints, and in fractional sizes and in standard shapes for top caps, base, corners, etc. It will be enameled in several colors. The tile is cemented to foundation sheets or board, insulating in character, and grooved to receive the flanges of the enameled sections.

Sales will be handled by the Porcelain Tile Co., Chicago. The product will be marketed as Porstelain tile. The Warren company has purchased a substantial interest in the Chicago company.

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Steel Shipments by Rivers Up in March

Movement of iron and steel products on the Ohio River in the Pittsburgh district during March amounted to 104,792 net tons, according to the United States Engineer office, Pittsburgh. Corresponding tonnage in February was 75,264, while movement in March, 1930, was 109,911 tons. Monongahela river commerce in steel products amounted to 76,137 tons in March, as compared with 58,847 tons in the previous months and 111,702 tons in March, 1930. No steel was moved on the Allegheny River in March or February, this year, and only 100 tons in March, 1930.

March Employment Gain in Chicago District

Further improvement occurred during March in employment and earnings of reporting manufacturing establishments in the seventh district, according to the Federal Reserve Bank of Chicago. The gain in the total for 10 groups was about the same as that shown in February and sufficient to offset slight declines in the non-manufacturing total, giving rise to the first gain in aggregate employment of all groups since September, 1929.

Changes from Feb. 15 show that the metals and products group gained 0.5 per cent in wage earners and 1.3 per cent in earnings. The vehicle group gained 2.6 per cent in wage earners and 10.4 per cent in earnings.

Construction work, which has contributed heavily to the falling off in non-manufacturing aggregates, recovered moderately after having declined continuously for seven months in both number of men and payrolls.

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The spring sectional conference of the Ohio Foundries Association will be held in Cleveland, May 22, at the Cleveland Athletic Club. The speakers will be R. C. Good, metallurgical engineer, Electro Metallurgical Sales Corpn., New York, who will talk on "Alloys and Their Effect in Iron and Steel," with particular regard for those used as scavenging agents, and E. L. Shaner, editor of *Steel*, whose subject will be "What Would Influence Better Price Level."

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SPEED RECORD OF 220 MILES PER HR. FOR COMMERCIAL PLANE

A cabin monoplane manufactured in the Burbank, Cal., plant of the Detroit Aircraft Corpn., has made a new speed record for a commercial plane, having attained 220 miles an hr. in level flight with a cargo of seven persons, baggage and fuel.

Officers Elected by Supply Associations

Officers elected by the Southern Supply and Machinery Dealers' Association, the National Supply and Machinery Distributers' Association and the American Supply and Machinery Manufacturers' Association, at their conventions in Washington last week, follow:

Southern Supply and Machinery Distributers' Association—President, C. W. Beckner, West Virginia-Kentucky Hardware & Supply Co., Huntington, W. Va.; first vice-president, Fred W. Glover, Textile Mill Supply Co., Charlotte, N. C.; second vice-president, W. W. Taylor, Arkansas Mill Supply Co., Pine Bluff, Ark.; secretary-treasurer, Alvin M. Smith, Smith-Courtney Co., Richmond, Va.

National Supply and Machinery Dealers' Association—President, H. H. Kuhn, Hardware Supply Co., Akron, Ohio; first vice-president, H. E. Ruhf, Cleveland Tool & Supply Co., Cleveland; second vice-president, E. B. Hunn, C. S. Mersick & Co., New Haven, Conn.; secretary-treasurer, George A. Fernley, Philadelphia; assistant secretary-treasurer, H. R. Rhinehart, Philadelphia; directors (two years), P. G. Maddock, Maddock & Co., Philadelphia; A. E. Harland, Charles A. Strelinger Co., Detroit; G. W. Donahue, E. S. Stacy Supply Co. and Brierly Lombard Co., Springfield, Mass.

American Supply and Machinery Manufacturers' Association — President, David C. Jones, Lunkenheimer Co., Cincinnati; first vice-president, J. Harvey Williams, J. H. Williams Co., New York; second vice-president, R. M. Gattshall, Republic Rubber Co., Youngstown; treasurer, George T. Bailey, Oliver Iron & Steel Corpn., Pittsburgh; secretary - manager, R. Kennedy Hanson, Pittsburgh.

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Steel Furniture Orders Up Slightly in March

WASHINGTON, May 5.—Orders for steel furniture stock goods rose to a value of $1,518,435 in March from $1,509,312 in February, according to reports received by the Bureau of the Census from 34 manufacturers. Shipments were valued at $1,588,458, against $1,598,009, while unfilled orders declined to $773,944 from $843,967. Orders for shelving furniture increased to $415,612 from $374,660, according to reports from 16 companies. Shipments rose to $436,107 from $355,564, while unfilled orders dropped to $386,535 from $407,030.

Standard Sales Agreement for Gray Iron Castings

A standard sales agreement and trade customs for gray iron castings, prepared by the Gray Iron Institute, has been approved by the National Association of Purchasing Agents.

Feeling the need for a definite set of conditions covering the relation between the buyer and seller of castings, the merchandising committee of the institute developed these standards more than a year ago. Recently, this committee has been working with the iron and steel committee of the National Association of Purchasing Agents to secure the acceptance of the standards.

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Barrel Plants Operated at One-Third in March

Plants operated by members of the Steel Barrel Manufacturers' Institute were running during March at 33.2 per cent of capacity. Capacity for producing I.C.C. barrels was engaged at only 9.9 per cent, while that for light barrels was employed at 39.2 per cent. Shipments during the month aggregated 328,956 bbl. and the volume of business is reported at $759,202.

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Sharp Drop in Exports of Machinery

WASHINGTON, May 1.—Making the sharp drop of $14,564,481 or 33.15 per cent, exports of machinery in March aggregated only $29,399,665, compared with $43,964,046 in February. The March total was the smallest for any month since October, 1926.

The most striking decline, exceeding by almost $2,000,000 the net decrease, was in agricultural machinery and implements, which fell to $5,176,000 from $21,670,000.

Total exports of industrial machinery increased to $13,216,946 from $12,900,000 in February. Outgoing shipments showing gains included automobile engines, other internal combustion engines, mining and quarrying machinery, "other metal-working machinery" and textile machinery.

Exports of machinery in the first quarter totaled $11,109,131, against $169,346,091 in the like period of 1930. Exports of machinery and vehicles in March, 1931, amounted to $50,077,459, and in the first quarter they were $165,850,519. Comparative totals for last year were $97,253,985 and $277,114,809.

Imports of machinery in March increased to $1,508,153 from $1,152,414 in February. Incoming shipments of industrial, office and printing machinery totaled $610,986.

Imports of Machinery into the United States

(By Value)

	March		Three Months Ended March	
	1931	1930	1931	1930
Metal-working machine tools	$37,099	$55,375	$72,326	$321,747
Agricultural machinery and implements	699,147	1,632,884	1,771,488	4,051,107
Electrical machinery and apparatus	293,875	180,191	570,185	430,238
Other power-generating machinery	44,611	12,041	77,112	102,217
Other machinery	314,894	818,649	1,119,029	2,420,179
Automobiles and other vehicles, except agricultural	118,527	224,358	299,747	593,706
Total	$1,508,153	$2,923,498	$3,909,887	$7,919,194

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	March		Three Months Ended March	
	1931	1930	1931	1930
Locomotives	....	$167	$28	$250
Other steam engines	13	67	84	132
Boilers	54	100	101	426
Accessories and parts	86	26	166	169
Automobile engines	407	1,521	781	2,783
Other internal combustion engines	555	955	1,234	1,761
Accessories and parts	208	329	592	382
Electric locomotives	....	138	59	316
Other electric machinery and apparatus	442	1,147	1,315	2,924
Excavating machinery	296	1,234	1,068	3,064
Concrete mixers	55	122	92	279
Road-making machinery	162	322	340	963
Elevators and elevator machinery	470	517	857	1,608
Mining and quarrying machinery	988	1,407	3,308	4,689
Oil-well machinery	748	3,367	4,040	9,561
Pumps	408	802	1,353	2,647
Sheet and plate metal-working machines	422	605	1,177	1,141
Forging machinery	293	159	972	602
Machine tools	2,444	2,939	7,456	6,642
Other metal-working machinery and parts	435	545	991	1,688
Textile machinery	656	931	1,730	2,711
Sewing machines	436	687	1,179	2,152
Shoe machinery	92	144	275	442
Flour-mill and gristmill machinery	51	59	80	100
Sugar-mill machinery	107	95	267	404
Paper and pulp-mill machinery	112	221	368	788
Sawmill machinery	42	94	137	283
Other woodworking machinery	91	156	283	495
Refrigerating and ice-making machinery	127	500	483	1,154
Air compressors	171	457	546	1,688
Typewriters	1,097	1,787	2,951	5,697
Power laundry machinery	86	150	258	480
Typesetting machines	174	370	625	1,067
Printing presses	240	475	520	1,305
Agricultural machinery and implements	5,176	15,277	39,144	50,255
All other machinery and parts	12,256	17,874	36,249	58,298
Total	$29,400	$55,746	$111,109	$169,346

Regularization of Employment Keynote of World Conference

Washington Sessions of International Chamber of Commerce Attended by 1000, Representing 35 Nations

WASHINGTON, May 5.—The keynote in employment regularization efforts in the United States is coordination, the American section of the International Chamber of Commerce points out in its report on "Employment Regularization in the United States of America," made at the sixth general congress of the chamber which is meeting here this week. It is being attended by about 1000 delegates from some 35 nations, and is dealing with a broad program of economic and other problems, with emphasis on those caused by the world-wide depression.

The American report on regularization of employment declared that "without indulging in sanguine predictions, it is reasonable to anticipate that the year 1931 will mark the beginning of a period in which a vast number of employers will give concentrated attention to amelioration of unemployment."

Promote Regularization Policies

It is suggested that community business organizations, such as chambers of commerce, may profitably engage in promoting the adoption of regularization policies by local employers and in improving local facilities for the placement of labor and for unemployment relief. The task of regional and national trade organizations, it is pointed out, is essentially one of eliminating uneconomic business practices and collecting and distributing accurate business statistics to aid their members in stabilizing the operation of their own companies.

"Although there are many obstacles to effective coordination of employment regularization projects," the report says, "the plans which are now being laid by business leaders to overcome the complexities of the problem of industrial employment give rise to an expectation that with the development of a new spirit of unity of purpose and unity of action, on the part of organized business, a more nearly satisfactory level of employment regularity can be permanently attained." Henry Bruere is chairman of the subcommittee which prepared the report.

No Country Can Remain Indifferent

The Europe-United States Committee on Economic Crises and Unemployment, of which Alberto Pirelli, Italian industrialist, is chairman, in an exhaustive report detailing economic and employment factors, declares that no country can remain indifferent to the world economic and social interest, to avert the crisis, "even at some sacrifice to itself." Then, it is pointed out, not only will world economy revive, but the national economies will recover "and flourish and thus reap a rich reward for any sacrifice."

Sir Arthur Balfour, managing director, Arthur Balfour & Co., steel manufacturers, Sheffield, England, will preside at the conference on "Regularization of Employment; Wages," to be held Thursday afternoon.

In addressing the opening session last Monday, President Hoover emphasized the desirability of reducing land armaments as a factor in reducing the tax burdens of the world, "removing a primary cause of unrest and establishing greater confidence for the long future.

"Endeavor, as we must, in support of every proposal of international economic cooperation that is just to our respective peoples, yet we must recognize that reduction of this gigantic waste of competition in military establishments is, in the ultimate, of an importance transcendent over all other forms of such economic effort," said the President.

In his opening address, George Theunis of Belgium, president of the International Chamber, declared that the coal and the iron and steel industries have been profoundly affected by the disfavor into which securities have fallen, with the resultant decline in new investments. These industries, as well as the machinery and building industries, it was declared, are strongly dependent upon the demand for and production of capital goods; they know real prosperity only at those periods when savings are actively invested in industry.

"The curve of steel production generally follows closely the curve of security issues, as the American and German schools of comparative economic research have so clearly demonstrated," said the speaker.

Mr. Theunis said he was personally convinced that the commercial policy and the customs tariff in most of the world constitute one of the fundamental causes of the actual economic troubles. Another cause was laid to "excessive mechanization based on borrowed capital."

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Freight Rate Cases

WASHINGTON, May 5.—Rates on scrap iron and steel in carloads from points in northwestern Missouri to Kansas City will be reduced to 17.5 per cent of the first class rate prescribed in the Western Trunk Line case, minimum 50,000 lb., if the Interstate Commerce Commission accepts a recommendation made by Examiner D. C. Dillon. For a minimum of 75,000 lb., the rate would be 13.5 per cent of the first class rate. Present rates range from 21.5 to 28.1 per cent of the first class rate provided in the Western Trunk Line case. Award of reparation was recommended. Existing rates on scrap from points in Southwestern territory to Kansas City, Mo., and Kansas City, Kan., were found not unreasonable. These rates are 15 per cent of the first class rate prescribed in the Waste Material Dealers' Association case, minimum 50,000 lb., and 12.5 per cent, minimum 75,000 lb.

Rates on scrap iron and steel from Gay, W. Va., to Ashland, Ky., and Portsmouth and New Boston, Ohio, would be fixed at 70 per cent of the basic scale prescribed in the general iron and steel rate case, plus 22c. per gross ton, if the Interstate Commerce Commission approves a proposed report by Examiner L. H. Dishman. The rates now are $2.82 a gross ton to Ashland and $3.81 to Portsmouth and New Boston.

Passing upon a complaint by the Youngstown Sheet & Tube Co., Examiner Edgar Snider, in a proposed report to the Interstate Commerce Commission, held that the rate of $1.31 a 100 lb., charged on 146 carloads of wrought steel pipe to the Black Hill district of South Dakota was unreasonable to the extent it exceeded $1.125, the rate established Sept. 1, 1929.

Application has been made to the Interstate Commerce Commission by both the Chicago & North Western and the Chicago, Milwaukee, St. Paul & Pacific railways for approval of a newly published tariff on iron and steel products from the Chicago mill district to Kenosha, Racine and Milwaukee, reducing the present rate of 14½c. per 100 lb. to 8½c., effective May 20. A year ago the commission ordered an advance in the rate from 9c. to 14½c. Thereupon Milwaukee shippers began to use Lake vessels to gain the advantage of the low water rate, and the competition has been so devastating that the railways are asking for a reduction.

The joint commodity rate of 44c. per 100 lb., minimum 46,000 lb., on wrought iron pipe from the Chicago district to Springfield, Mo., is not unreasonable, according to a decision handed down last week by the Interstate Commerce Commission.

Screw Thread Practice Survey Begun

Collection of samples of threaded products from 49 companies in New England and New York marks the beginning of a survey of screw thread practice in the United States.

This survey, undertaken by the sectional committee on the standardization and unification of screw threads, is intended as a preliminary activity to the revision of the present American National Standard for Screw Threads of bolts, machine screws, nuts and commercially tapped holes. The sectional committee is sponsored by the American Society of Mechanical Engineers and the Society of Automotive Engineers under the procedure of the American Standards Association.

Representatives of the committee will call on 150 manufacturers and users of threaded products. Each company will be requested to give from stock five samples each in the following 12 sizes: Coarse-thread series 6-32, 10-24, ⅜-16, ½-13, ¾-10, 1-8 and 1¼-7; fine-thread series, ⅜-24, 7/16-20, ½-20, ⅝-18 and 1-14. These samples will be forwarded to the gage division of the Bureau of Standards, where the various thread elements will be measured and the samples compared with the American national standard.

With the exception of the "not-go" gages, all thread measuring instruments and gages required to make the necessary inspection has been loaned by gage manufacturers.

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Pig Iron Imports Were Somewhat Higher

Imports of pig iron into the United States are reported by the Department of Commerce to have been 7357 tons in March. While this is the lowest March total since 1922, it represents a substantial gain from the abnormally low 3456 tons of February. The current total is only about 60 per cent of that for the corresponding month of 1930.

For the first quarter, imports aggregated 21,954 tons—a decline of more than 25 per cent from the first quarter of 1930. Incidentally, the current first quarter was the lowest first quarter since 1927.

British India continues to supply the lion's share of the import tonnage. Pig iron from India in March was more than one-half the total, and for the first quarter was more than 70 per cent of the total. In March the Netherlands was in second position, with Sweden third and Great Britain fourth. These three countries occupied second, third and fourth positions in the first quarter, but with Sweden leading the Netherlands and Great Britain fourth.

United States Imports of Pig Iron by Countries of Shipment

(In Gross Tons)

	March		Three Months Ended March	
	1931	1930	1931	1930
United Kingdom	793	1,941	893	4,730
British India	3,787	8,707	15,426	21,323
Germany	....	....	....	....
Netherlands	1,285	977	2,020	1,430
Canada	....	30	....	306
France	....	....	25	....
Belgium	....	....	....	....
Norway	35	426	86	926
Sweden	1,102	101	2,978	759
All others	355	....	526	3
Total	7,357	12,182	21,954	29,477

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Steel Institute Elects Four New Directors

E. R. Crawford, president, McKeesport Tin Plate Co., McKeesport, Pa.; W. W. Holloway, president, Wheeling Steel Corpn., Wheeling, W. Va.; Frank Purnell, president, Youngstown Sheet & Tube Co., Youngstown, and Harry E. Sheldon, president, Allegheny Steel Co., Pittsburgh, were elected directors of the American Iron and Steel Institute, at the annual meeting of the institute held May 4 in New York. They are of the class whose terms will expire in 1934.

The class numbers 10, the following having been elected: E. A. S. Clarke, secretary of the institute; George G. Crawford, president, Jones & Laughlin Steel Corpn.; William J. Filbert, controller, United States Steel Corpn.; Samuel Mather, Cleveland; George M. Verity, chairman, American Rolling Mill Co., Middletown, Ohio, and Homer D. Williams, president, Pittsburgh Steel Co. William H. Donner and Isaac M. Scott, formerly members of the board, have retired from active participation in the steel industry.

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To Spend $36,000,000 on Rail Mills

The United States Steel Corpn. has authorized the expenditure of $36,000,000 to revamp and reequip rail mills of its subsidiaries so that they will be capable of rolling heavier sections and longer lengths up to 60 ft.

United Engineering Earns $4.86 a Share

"The future outlook for United Engineering & Foundry Co., Pittsburgh, is very promising, and, with the business already booked and under way, 1931 earnings should approximate those of 1930," George T. Ladd, president, declared at the annual meeting of stockholders.

During 1930, he pointed out, a satisfactory volume of business was secured, and net income after Federal taxes was $2,114,359, equivalent to $4.86 a share on the outstanding common stock, compared with $1,671,887, or $3.76 a common share, in 1929.

Frank B. Bell, president of the Edgewater Steel Co., Pittsburgh, and Harry M. Naugle, Canton, Ohio, were elected directors.

President Ladd told stockholders that the company is now consolidating the Lincoln and Canton plants at Canton, Ohio, so that all iron and iron alloy rolls will be manufactured at that point. Important economies are expected to result from this move.

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Republic Steel Corpn. Has $1,692,593 Loss

The Republic Steel Corpn. reports a loss of $1,692,593 for the first quarter. This was without provision for preferred dividends, which are not at present being paid, except for $75,000 paid on guaranteed stock of the Trumbull-Cliffs Furnace Co. The net gain from operations, after deducting charges for maintenance and repairs, was $1,277,302. Interest on indebtedness was $918,324, and provision for depreciation amounted to $1,976,571.

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Financial Notes

M. A. Hanna Co., Cleveland, report a consolidated net corporate income for the March quarter of $336,627, equal to 9c. a share, compared with $381,219, or 13c. a share, in the first quarter last year.

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National Acme Co., Cleveland, reports a net loss for the first quarter of $242,375, which compares with a net profit of $191,112 after taxes during the first quarter of last year.

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Inland Steel Co., Chicago, reports net profits for the first quarter at $633,873.58, after depreciation, bond interest and allowance for Federal taxes. The annual dividend rate was reduced from $4 to $2.50.

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Braeburn Alloy Steel Corpn., Braeburn, Pa., has removed its Cleveland office and warehouse to larger quarters at 1371 East Eighteenth Street. J. H. Cox is district sales manager.

Gray Iron Foundries in Third Monthly Gain

An increase of 5 per cent in production by gray iron foundries during March is shown in the monthly report of the Gray Iron Institute. New business and unfilled orders also increased. It was the third consecutive month that production gained and the second consecutive month in which new business and unfilled orders increased.

Production in March, based on reports from 159 foundries, was 60.4 per cent of normal, compared with 55.3 per cent in February. New business was 66.9 per cent of normal, against 52.2 per cent in February, and unfilled orders were 47 per cent, against 38.8 in the previous month.

The greatest activity was shown in the Middle West-Southern territory, comprising Wisconsin, Illinois and the territory west of the Mississippi River. Foundries in that district operated in March at 63.1 per cent, compared with 57.9 per cent in February. Operations in Pennsylvania, Michigan, Ohio and Indiana and the Southern territory east of the Mississippi River were 62.6 per cent, against 55.4 per cent in February. New York, New Jersey, the New England States and Canada report operations of 56.4 per cent, against 51.9 per cent in February. The Chicago district increased to 58.5 per cent from 55.9 per cent in February.

The gain in production in March was in foundries producing over 100 tons a month. Those with a capacity of 100 to 400 tons operated at 60.2 per cent of capacity and those with a capacity of over 400 tons a month operated at 61.3 per cent. Operations of foundries with a capacity up to 100 tons a month were unchanged at 66.5 per cent. Three foundries reported the business outlook good, 54 fair, 58 poor and 16 bad.

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Heavy Increase in Iron Ore Imports

March imports of iron ore into the United States are reported by the Department of Commerce at 169,271 gross tons. This is a gain of nearly 80 per cent over the low February figure of 94,529 tons, and is the largest total since last December. Excluding January and February, 1931, and November, 1930, however, the March total was the lowest for any month since March, 1928.

For the first quarter, imports were 413,486 tons. This represented a drop of 48 per cent from the first quarter of last year.

Chile continues to hold the lead, with slightly more than one-half of the total for March and about 64 per cent of the total for the first quarter. In March Russia was in second position, with more than 30,000 tons, or about 18 per cent of all. Sweden and Cuba were in third and fourth positions. Russia was second also in the first quarter, followed in order by Sweden, Spain and Cuba.

Sources of American Imports of Iron Ore

(In Gross Tons)

	March		Three Months Ended March	
	1931	1930	1931	1930
Canada	9	....	9	70
Cuba	11,500	47,000	11,500	127,000
Chile	85,133	201,261	261,313	538,593
Spain	....	12,883	19,597	28,483
Sweden	22,904	14,071	29,894	27,572
French Africa	4,500	19,200	4,500	35,820
Russia	30,184	....	65,947	....
Other countries	15,041	6,925	20,726	19,777
Total	169,271	301,340	413,486	797,315

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Foundry Equipment Orders Gain

The Foundry Equipment Manufacturers' Association reports that its index figure for orders in March was 174.4, a striking gain over the figure of 54.71 for February, the base of 100 representing average monthly shipments for 1922, 1923 and 1924. The three months' moving average of orders has risen to 98.1 from 59.9 at the end of February, and unfilled orders have increased to 314.6 from 93.5 at the end of February.

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Steel Castings Orders Gained in March

WASHINGTON, May 1.—Making a gain of 6346 tons, orders for commercial steel castings in March totaled 46,638 tons, or 32 per cent of capacity, against 40,292 tons, or 27.7 per cent of capacity, in February, according to reports received by the Bureau of the Census from 131 establishments. Production rose 5194 tons to a total of 54,714 tons, or 37.6 per cent of capacity, from 49,520 tons, or 34 per cent of capacity.

March orders consisted of 10,612 tons of railroad specialties and 36,026 tons of miscellaneous castings. Production consisted of 13,611 tons of railroad specialties and 41,103 tons of miscellaneous castings.

Orders in the first quarter of 1931 amounted to 133,740 tons, against 338,381 tons in the corresponding period of last year. Production totaled 150,528 tons and 330,100 tons respectively.

Sheet Rolling Capacity Is 8,044,700 Tons a Year

A new directory of flat rolled steel manufacturers, which for the first time includes hot and cold-rolled strip, has been issued by the National Association of Flat Rolled Steel Manufacturers, Cleveland. It gives the total annual sheet capacity of the United States as 8,044,700 tons. The sheet mills have an annual capacity of 5,894,400 tons and jobbing mills 815,300 tons, or a total of 6,709,700 tons, and the capacity of the continuous sheet mills is 1,335,000 tons. There are 672 sheet mills and 35 jobbing mills, a total of 707. The galvanized sheet capacity is given as 2,086,100 tons. There are 150 galvanizing pots.

The hot-rolled strip capacity is given as 4,746,800 tons and the cold rolled strip capacity is 1,066,900 tons.

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Non-Residential Building Shows Heavy Increase

Building permits in March in 347 cities showed an increase of 50.6 per cent over the figures for the same cities in February, according to the United States Bureau of Labor Statistics. The March total was $152,871,000, including construction, alterations and repairs. New non-residential buildings in March amounted to $82,316,000, which was an increase of 74.5 per cent over February for the same cities. New residental buildings in March, at $50,603,000, showed an increase of 34.4 per cent.

A report on construction trends by the Associated General Contractors of America indicates that State and municipal bond issues in March were the second largest for any month on record, having been exceeded only by those of December, 1929. Concrete surface pavement awards in March broke all previous records for the month. They have been exceeded only twice before in any month. The total for road work during the first quarter was far above any previous quarter's record.

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Peoria, Ill., is preparing plans for the formal opening of its new $400,000 river terminal. Track space is now available for 80 cars and space is available to increase this trackage to 200-car capacity. A floating dock is to be moored against the warehouse and freight will be moved from barges by conveyors. The Federal Government has spent approximately $1,500,000 in dredging work between Peoria and the Mississippi River, and a 9-ft. channel is now ready for boats at low water, with the exception of the two locks at La Grange and Kampsville, which draw 7 ft. of water.

Pig Iron Daily Output in April 2.7 Per Cent Above March—Loss of Three Furnaces

WHILE the daily average output of pig iron in April, at 67,317 gross tons, was 2.7 per cent above the March average of 65,556 tons, the month closed with a decrease in the operating rate, due primarily to the net loss of three active furnaces. This reverses the trend of the three preceding months, wherein there was a steady gain in the operating rate, month by month.

Coke pig iron production in April was 2,019,529 tons in 30 days. This contrasts with 2,032,248 tons in the 31 days of March. Aside from the figures in the current depression, the April total was the smallest for any month since August, 1924, showed 1,887,145 tons.

Comparing with past years, the April output was at the smallest daily rate for that month since 1921. With that exception it was the smallest since 1909. It may be compared with 106,062 tons daily in April, 1930, and with 122,087 tons in 1929 — the largest April record ever made and the sixth largest figure for any month.

Net Loss of Three Furnaces

Five furnaces were blown out during April and two were blown in, leaving a net loss of three furnaces. Thus, there were 113 active stacks on May 1, against 116 on April 1. The net gain of active furnaces since Jan. 1 is reduced to 18, compared with 21 a month ago. Only seven furnaces went in or out—the smallest number of changes

Daily Average Production of Coke Pig Iron in the United States by Months—Gross Tons

	1927	1928	1929	1930	1931
Jan.	100,123	92,573	111,044	91,209	55,299
Feb.	105,024	100,094	114,507	101,390	60,950
Mar.	112,366	103,215	119,822	104,715	65,556
April	114,074	106,183	122,087	106,062	67,317
May	109,385	105,931	125,745	104,283	.....
June	102,988	102,733	123,908	97,804	.....
½ year	107,351	101,763	119,564	100,891	.....
July	95,199	99,091	122,100	85,146	.....
Aug.	95,073	101,180	121,151	81,417	.....
Sept.	92,498	102,077	116,585	75,890	.....
Oct.	89,810	108,832	115,745	69,831	.....
Nov.	88,279	110,084	106,047	62,237	.....
Dec.	86,960	108,705	91,513	53,732	.....
Year	99,266	103,382	115,851	86,025	.....

Pig Iron Production by Districts, Gross Tons

	April (30 days)	March (31 days)	Feb. (28 days)	Jan. (31 days)
New York and Mass.	95,375	100,660	91,216	99,352
Lehigh Valley	43,613	47,293	40,232	41,033
Schuylkill Valley	25,665	29,390	24,711	25,509
Lower Susq. and Lebanon Valley	18,652	19,187	16,458	18,974
Pittsburgh district	431,116	427,034	356,341	357,128
Shenango Valley	53,893	46,476	35,361	38,929
Western Pennsylvania	55,632	56,354	45,657	40,988
Maryland, Va. and Ky.	78,442	85,148	78,374	82,436
Wheeling district	110,415	98,348	88,372	102,320
Mahoning Valley	175,963	176,262	134,247	75,339
Central and North'n Ohio	194,453	198,855	172,266	184,519
Southern Ohio	26,460	32,230	7,730	26,160
Illinois and Indiana	445,669	453,241	379,537	384,453
Mich., Minn., Mo., Wis., Colo. and Utah	77,427	86,972	80,452	85,186
Alabama	186,534	172,982	153,900	150,251
Tennessee	220	1,816	1,767	1,689
Total	2,019,529	2,032,248	1,706,621	1,714,266

Daily Rate of Pig Iron Production by Months—Gross Tons

	Steel Works Iron	Merchant Iron*	Total
April, 1930	85,489	20,573	106,062
May	84,310	19,973	104,283
June	77,883	19,921	97,804
July	66,949	18,197	85,146
August	64,857	16,560	81,417
September	62,342	13,548	75,890
October	57,788	12,043	69,831
November	49,730	12,507	62,237
December	40,952	12,780	53,732
January, 1931	45,883	9,416	55,299
February	49,618	11,332	60,950
March	54,075	11,481	65,556
April	53,878	13,439	67,317

*Includes pig iron made for the market by steel companies.

Coke Furnaces in Blast

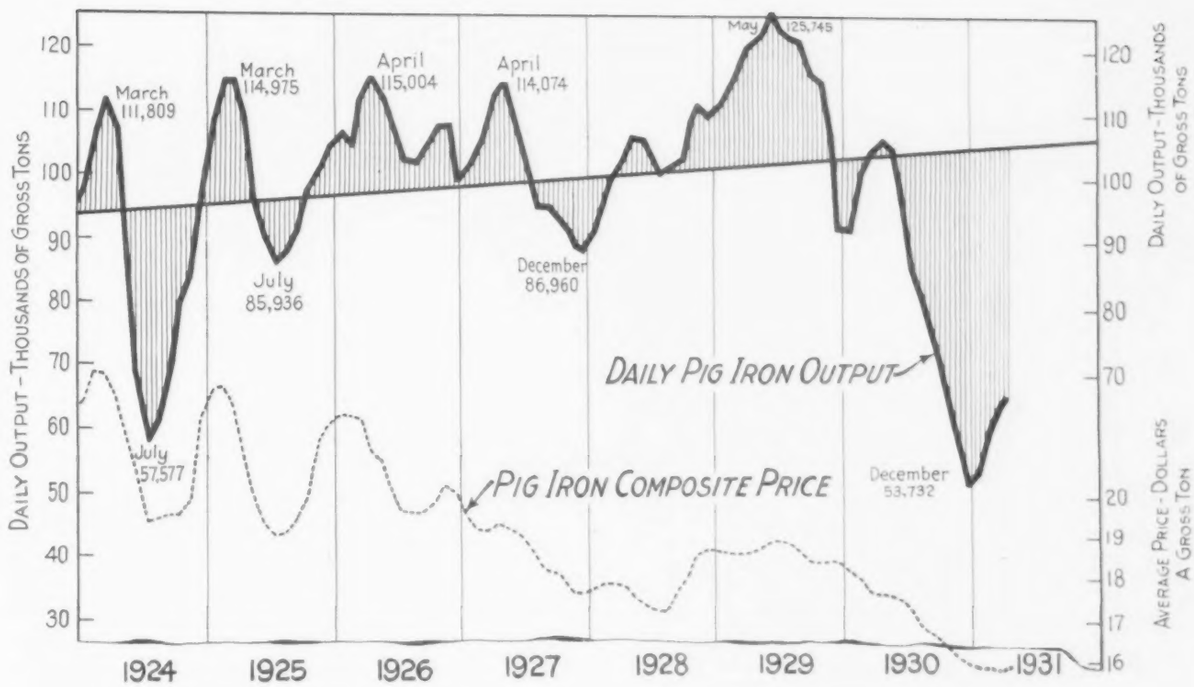
Furnaces	May 1 Number in Blast	May 1 Rate of Operation	April 1 Number in Blast	April 1 Rate of Operation
New York:				
Buffalo	4	2,485	4	2,600
Other N. Y. and Mass.	2	695	2	655
New Jersey	0	....	0	....
Pennsylvania:				
Lehigh Valley	4	1,455*	4	1,525*
Schuylkill Valley	2	855	2	950
Susquehanna Valley	1	620	1	620
Ferromanganese	0	....	0	....
Lebanon Valley	0	....	0	....
Ferromanganese	0	....	0	....
Pittsburgh District	22	14,540	22	14,700
Ferro. and Spiegel	1	140	1	150
Shenango Valley	3	1,795	3	1,775
Western Pennsylvania	2	1,410	2	1,395
Ferromanganese	2	445	2	420
Maryland	3	2,060	3	2,200
Wheeling District	5	3,950	4	3,170
Ohio:				
Mahoning Valley	9	5,865	9	5,815
Central and Northern	10	6,040	11	6,705
Southern	3	880	3	890
Illinois and Indiana	20	14,545	21	14,780
Mich., Wis. and Minn.	3	1,645	3	1,580
Colo., Mo. and Utah	2	780	3	1,225
The South:				
Virginia	0	....	0	....
Ferromanganese	1	165	1	165
Kentucky	1	450	1	435
Alabama	12	6,060	12	5,965
Ferro. and spiegel	1	160	1	160
Tennessee	0	....	1	60
Total	113	66,980	116	67,880

*Includes spiegeleisen.

Production of Coke Pig Iron in United States by Months Gross Tons

	1929	1930	1931
January	3,444,370	2,827,464	1,714,266
February	3,206,185	2,838,920	1,706,621
March	3,714,473	3,246,171	2,032,248
April	3,662,625	3,181,868	2,019,529
4 months	14,027,653	12,094,423	7,472,664
May	3,898,082	3,232,760	.....
June	3,717,225	2,934,129	.....
½ year	21,640,960	18,261,312	.....
July	3,785,120	2,639,537	.....
August	3,755,680	2,523,921	.....
September	3,497,564	2,276,770	.....
October	3,588,118	2,164,768	.....
November	3,181,411	1,867,107	.....
December	2,836,916	1,665,690	.....
Year*	42,285,769	31,399,105	.....

*These totals do not include charcoal pig iron. The 1930 production of this iron was 96,580 gross tons.



Daily production of pig iron remains somewhat further below needs than in 1924

Inclined line represents the gradually increasing theoretical needs of the country, ascertained by a balancing of the ups and downs in production. It shows an average yearly increase in consumption of about 575,000 tons.

in several years. The closest recent approach was in June, 1929, with three in and four out, a total of seven, also.

Of the five furnaces blown out in April two belong to the United States Steel Corpn., two to independent steel companies and one is a ferro-phosphorus furnace. One of the furnaces blown in is the property of the Steel Corporation and one belongs to an independent steel company. Thus, the Steel Corporation had one less furnace in action on May 1 than on April 1, the independent steel companies had one fewer, and the merchant furnaces were one less.

There were 113 furnaces making iron on May 1, at an estimated daily rate of 66,980 tons. This contrasts with 116 furnaces active one month earlier and running at 67,880 tons a day.

Furnace Changes in April

Of the five furnaces blown out in April one was the "E" furnace of the Edgar Thomson works of the Carnegie Steel Co., one was a National Tube Co. furnace in northern Ohio, one was a Colorado Fuel & Iron Co. furnace at Pueblo, one was a Calumet furnace in the Chicago district and one was the Wrigley furnace of the Tennessee Products Corpn. The two furnaces blown in during the month included one Eliza furnace of the Jones & Laughlin Steel Corpn., at Pittsburgh. The other was No. 2 Mingo furnace of the Carnegie Steel Co., in the Wheeling district.

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Production of slab zinc at zinc reduction plants in the United States in 1930 amounted to 532,894 net tons, valued at $51,158,000, according to the Bureau of Mines. This production consisted of 489,361 tons of primary metal made from domestic ore; 8684 tons of primary metal made from Mexican ore, and 34,849 tons of secondary metal. Production in 1930 was smaller by 139,901 tons, or 21 per cent, than that in 1929. Of the total output in 1930, 131,188 tons was electrolytic zinc, produced in 1930 in Montana, Idaho and Illinois.

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The next meeting of the New York section of the Electrochemical Society will be held at 8 p. m., on Friday, May 22, at the Westinghouse Lighting Institute, Grand Central Palace, New York. The program consists of a talk by Dr. A. Brann of the engineering department, Westinghouse Lamp Co., on "The Chemistry of the Incandescent Lamp," and an address by Dudley Willcox, treasurer and assistant manager of the Ajax Electrothermic Corpn., on "Recent Coreless Induction Furnace Developments."

Production of Steel Companies for Own Use—Gross Tons

	Total Pig Iron			Spiegel and Ferromanganese*		
	1929	1930	1931	1929	1930	1931
Jan.	2,651,416	2,214,875	1,422,382	28,208	27,260	14,251
Feb.	2,498,901	2,284,234	1,389,304	25,978	21,310	19,480
March	2,959,295	2,600,980	1,676,316	24,978	23,345	27,899
April	2,826,028	2,564,681	1,615,375	22,413	27,777	25,456
4 months	10,935,640	9,664,770	6,103,377	101,577	99,692	87,086
May	3,105,404	2,613,628	.....	25,896	30,296	.....
June	2,999,798	2,304,223	.....	33,363	27,327	.....
½ year	17,040,842	14,582,621	.....	160,836	157,325	.....
July	3,039,370	2,075,414	.....	31,040	17,728	.....
Aug.	3,065,874	2,010,572	.....	28,461	20,909	.....
Sept.	2,862,799	1,870,269	.....	27,505	21,181	.....
Oct.	2,902,960	1,791,421	.....	31,108	24,480	.....
Nov.	2,498,291	1,491,927	.....	31,866	18,619	.....
Dec.	2,112,704	1,269,529	.....	28,564	16,288	.....
Year	33,522,840	25,101,753	.....	339,380	276,530	.....

*Includes output of merchant furnaces.

Production of Rolled Steel 28 Per Cent Off in 1930

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, GROSS TONS, 1890–1930.

Years.	Iron and steel rails.	Plates and sheets.	Wire rods.	Structural shapes.	Nail plate.	All other finished rolled.	Total Gross tons.
1915	2,204,203	6,077,694	3,035,907	2,437,003	31,929	10,546,188	24,392,924
1916	2,854,518	7,453,980	3,518,746	3,029,964	30,088	15,493,093	32,380,389
1917	2,944,161	8,267,616	3,137,138	3,110,000	22,864	15,585,921	33,067,700
1918	2,540,892	8,799,135	2,562,390	2,849,969	18,310	14,385,058	31,155,754
1919	2,203,843	7,372,814	2,538,476	2,614,036	12,832	10,359,543	25,101,544
1920	2,604,116	9,337,680	3,136,907	3,306,748	20,577	13,941,835	32,347,863
1921	2,178,818	4,260,574	1,564,330	1,272,624	14,573	5,483,087	14,774,006
1922	2,171,776	7,968,397	2,654,741	2,718,768	21,969	10,916,353	26,452,004
1923	2,904,516	9,497,717	3,075,892	3,405,197	22,833	14,370,921	33,277,076
1924	2,433,332	8,087,883	2,522,545	3,283,708	22,175	11,736,792	28,086,435
1925	2,785,257	9,807,659	2,844,656	3,604,130	22,038	14,323,220	33,386,960
1926	3,217,649	10,529,056	2,722,032	3,911,863	17,337	15,098,155	35,495,892
1927	2,806,486	9,627,734	2,770,271	3,742,445	18,051	13,914,044	32,879,031
1928	2,647,493	11,006,050	3,080,816	4,096,143	16,200	16,816,214	37,662,916
1929	2,722,138	12,436,312	3,134,409	4,778,020	9,827	17,988,710	41,069,416
1930	1,873,233	9,067,366	2,348,600	3,512,473	*	12,711,335	29,513,007

*Included in "all other finished rolled."

PRODUCTION OF MERCHANT BARS, SHOWING IRON AND STEEL MERCHANT BARS SEPARATELY, GROSS TONS, 1911–1930.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1911	835,625	2,211,737	3,047,362	1921	198,324	1,367,430	1,565,754
1912	944,790	2,752,324	3,697,114	1922	317,665	3,660,993	3,978,658
1913	1,026,632	2,930,977	3,957,609	1923	404,730	5,148,066	5,552,796
1914	563,171	1,960,460	2,523,631	1924	258,737	4,022,184	4,280,921
1915	657,107	3,474,135	4,131,242	1925	290,488	5,368,827	5,659,315
1916	993,948	5,236,354	6,230,302	1926	252,437	5,221,399	5,473,836
1917	983,926	5,226,031	6,209,957	1927	187,995	4,682,252	4,870,247
1918	846,898	5,395,851	6,242,749	1928	165,277	6,112,558	6,277,835
1919	446,549	3,945,075	4,391,624	1929	154,690	6,316,456	6,471,146
1920	663,032	5,467,208	6,130,240	1930	95,234	4,043,130	4,138,364

PRODUCTION OF WROUGHT PIPE AND SEAMLESS STEEL TUBES, INCLUDING BOILER TUBES, GROSS TONS, IN 1930.

Kinds of pipe or tubes.	*Lap weld and butt weld pipe or tubes—Gross tons.			Seamless pipe or tubes—Gross tons.		
	Iron	Steel.	Total welded.	†Hot finished.	Cold drawn.	Total seamless
Black, standard	46,924	910,571	957,495	16,222	1,410	17,632
Galvanized	30,798	361,202	392,000	2,154		2,154
Oil country goods	12,550	677,229	689,779	912,003	1,760	913,763
Mechanical tubes				40,784	51,850	92,634
O. D. & miscellaneous		177,516	177,516	5,643	23,700	29,343
Boiler tubes	7,039	23,559	30,598	113,369	24,822	138,191
Total	97,311	2,150,077	2,247,388	1,090,175	103,542	1,193,717

* Does not include pipe or tubes made by the electric or acetylene welded processes.
† Does not include hot finished tubes subsequently cold drawn.

PRODUCTION OF WROUGHT PIPE AND BOILER TUBES, 1926–1930.

Years.	Black, standard.	Galvanized	Oil country goods	O. D and miscellaneous	Boiler tubes	Total Gross tons.
1926	1,377,747	526,101	1,328,294	109,520	60,853	3,402,515
1927	1,237,783	488,232	1,199,936	144,515	46,985	3,117,451
1928	1,189,842	483,886	1,108,446	82,279	59,457	2,923,910
1929	1,223,639	485,390	1,093,277	154,758	61,676	3 018,740
1930	957,495	392,000	689,779	177,516	30,598	2,247,388

PRODUCTION OF SEAMLESS STEEL TUBES, GROSS TONS, 1925–1930.

Years.	Hot finished.	Cold drawn.	Total.	Years.	Hot finished.	Cold drawn.	Total
1925	403,965	164,225	568,190	1928	906,032	172,895	1,078,927
1926	620,936	154,393	775,329	1929	1,097,459	206,026	1,303,485
1927	725,970	138,170	864,140	1930	1,090,175	103,542	1,193,717

PRODUCTION OF CAST-IRON PIPE AND FITTINGS, 1929–1930.

Kinds of pipe.	1929—Net tons.			1930—Net tons.		
	Pipe.	Fittings.	Total	Pipe.	Fittings.	Total.
Gas and water*	1,238,177	54,929	1,293,106	1,138,862	47,177	1,186,039
Soil and plumbers.	266,435	91,050	357,485	188,040	61,857	249,897
Total	1,504,612	145,979	1,650,591	1,326,902	109,034	1,435,936

* Includes culvert pipe.

PRODUCTION OF CAST-IRON PIPE AND FITTINGS, 1925–1930.

Years.	Gas and water.*	Soil and plumbers	Total. Net tons	Years.	Gas and water *	Soil and plumbers	Total. Net tons.
1925	1,414,252	510,483	1,924,735	1928	1,371,327	500,693	1,872,020
1926	1,535,956	469,228	2,005,184	1929	1,293,106	357,485	1,650,591
1927	1,490,590	481,638	1,972,228	1930	1,186,039	249,897	1,435,936

* Includes culvert pipe.

PRODUCTION OF PLATES AND SHEETS BY KINDS, 1929–1930.

Kinds	1929—Gross tons			1930—Gross tons		
	Iron.	Steel.	Total.	Iron.	Steel.	Total
Universal plates*	3,127	1,422,173	1,425,300	77	1,040,638	1,040,715
Sheared plates—						
Rolled on single stands		2,885,941	2,855,941		2,087,893	2,087,893
Roughed and fin on sep. stands		740,900	740,900		534,215	534,215
Black sheets rolled on sheet of job. mills		5,254,998	5,254,998		3,511,557	3,511,557
Black plates, including black plates for tinning and black plate specialties rolled on tin mills		2,159,173	2,159,173		1,892,986	1,892,986
Total	3,127	12,433,185	12,436,312	77	9,067,289	9,067,366

* Include flats or bars over 6 inches wide

PRODUCTION OF BLACK PLATES FOR TINNING, SHOWING IRON AND STEEL SEPARATELY, GROSS TONS, 1905–1930.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1905	3,152	504,435	507,587	1918		1,489,586	*1,489,586
1906	5,666	570,413	576,079	1919	144	1,144,457	*1,144,601
1907	3,161	500,911	504,072	1920		1,449,330	*1,449,330
1908	2,954	510,817	513,771	1921		786,962	*786,962
1909	4,261	602,221	606,482	1922		1,266,652	*1,266,652
1910	2,893	709,244	712,137	1923	477	1,498,353	*1,498,830
1911	3,515	792,083	795,598	1924		1,415,182	*1,415,182
1912	5,378	976,819	982,197	1925		1,632,236	*1,632,236
1913	2,779	824,487	827,266	1926		1,761,944	*1,761,944
1914	2,272	935,909	938,181	1927		1,657,215	*1,657,215
1915	2,038	1,091,307	1,093,345	1928		1,791,021	*1,791,021
1916	1,878	1,272,259	*1,274,137	1929		1,698,640	*1,698,640
1917	655	1,504,683	*1,505,338	1930		1,691,938	*1,691,938

* Does not include black sheets rolled on sheet mills and used in the manufacture of long terne plates.

PRODUCTION OF WIRE RODS, GROSS TONS, 1899–1930.

Years.	Tons.	Years.	Tons.	Years.	Tons.	Years	Tons.
1899	1,036,398	1907	2,017,583	1915	3,095,907	1923	3,075,892
1900	846,291	1908	1,816,949	1916	3,518,746	1924	2,522,545
1901	1,365,934	1909	2,335,685	1917	3,137,138	1925	2,844,656
1902	1,574,293	1910	2,241,830	1918	2,562,390	1926	2,722,032
1903	1,503,455	1911	2,450,453	1919	2,538,476	1927	2,770,271
1904	1,699,028	1912	2,653,553	1920	3,136,907	1928	3,080,816
1905	1,808,688	1913	2,464,807	1921	1,564,330	1929	3,134,409
1906	1,871,614	1914	2,431,714	1922	2,654,741	1930	2,348,600

Small quantities of copper-clad steel wire rods are included.

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES, GROSS TONS, 1919–1930.

Years.	Heavy shapes.	Light shapes.	Total.	Years.	Heavy shapes.	Light shapes.	Total.
1919	2,136,424	477,612	2,614,036	1925	3,049,817	554,313	3,604,130
1920	2,741,120	565,628	3,306,748	1926	3,330,572	581,091	3,911,663
1921	1,082,727	189,897	1,272,624	1927	3,083,211	659,234	3,742,445
1922	2,337,026	381,742	2,718,768	1928	3,408,545	687,598	4,096,143
1923	2,917,446	487,751	3,405,197	1929	4,055,615	722,405	4,778,020
1924	2,805,084	478,624	3,283,708	1930	3,010,847	501,626	3,512,473

Almost all heavy structural shapes are rolled from steel.

PRODUCTION OF CONCRETE BARS, SHOWING IRON AND STEEL CONCRETE BARS SEPARATELY, GROSS TONS, 1915–1930.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1915		353,408	353,408	1923	368	680,499	680,867
1916	2,683	458,717	461,400	1924	507	655,615	656,122
1917	1,497	469,687	471,184	1925	1,195	818,392	819,587
1918	468	344,152	344,620	1926	1,649	814,180	815,829
1919	2,295	416,726	419,021	1927	2,428	813,585	816,013
1920	698	571,747	572,445	1928	462	951,426	951,888
1921	1,094	226,134	227,228	1929	557	951,793	952,350
1922	696	575,120	575,816	1930	160	849,991	*850,151

* Includes 167,470 tons of concrete bars rolled from old rails.

PRODUCTION OF HOT ROLLED STEEL STRIPS (INCLUDING FLATS FOR COLD ROLLING), 1920–1930.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1920	586,524	1924	827,101	1928	2,161,988
1921	238,005	1925	1,248,635	1929	2,502,793
1922	641,310	1926	1,222,089	1930	1,941,862
1923	865,506	1927	1,318,419		

▲▲▲ PERSONALS ▲▲▲

EDWARD L. FORSTNER, for 14 years associated with David Lupton's Sons Co., Philadelphia, has been elected president, succeeding DAVID D. LUPTON, who has become chairman of the board. Prior to Mr. Forstner's connection with the company, he was a railroad contractor. He was made vice-president of the Lupton company in 1925. H. C. GRUBBS, formerly vice-president in charge of sales of R.C.A.-Victor, Inc., has been made executive vice-president.

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WILLIAM L. HARTLEY, who has been in charge of the foundry sales division of the Link-Belt Co., Chicago, has been appointed Detroit district sales manager, with offices at 5938 Linsdale Avenue, Detroit.

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OSCAR SCHWEGEL has been appointed superintendent of the Dayton Casting Co., Dayton, Ohio, succeeding the late Ernest Ackerman. JOHN J. HOCKEY, formerly president of the Superior Casting Co., has become associated in a sales capacity with the Dayton company.

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C. H. ADAMSON, who has been director of advertising and sales-promotion work for the Stephens-Adamson Mfg. Co., Aurora, Ill., has been made district manager of the Chicago office, with headquarters at 20 North Wacker Drive.

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M. B. MACNEILLE, for the past 19 years with the pump division of Fairbanks, Morse & Co., has resigned and has joined the sales staff of the Dayton-Dowd Co., Quincy, Ill.

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H. T. BENNETT, recently appointed manager of sales in the Chicago district for the American Sheet & Tin Plate Co., succeeding W. H. EATON, entered the steel industry in 1886 in the Chicago office of Merchant & Co. Later he was identified for a time with the old Falcon Steel Co., Niles, Ohio, subsequently going with the American Sheet Steel Co. He has served this company and the American Sheet & Tin Plate Co. for 31 years and has been assistant sales manager in the Chicago district since 1909. A. P. BRONSON, who becomes assistant manager in the Chicago district, began his business career with the Washington Tin Plate Co., Washington, Pa., but has been identified with the American company for 30 years. He has been in the Chicago district office since 1909.

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JOHN SCOTT, assistant production manager of the Milwaukee works of the Inland Steel Co., has resigned to become warehouse manager of the new plant recently completed by the Moise Steel Co. in West Milwaukee. The Moise company is an extensive jobber in bars, plates, sheets and other finished steel products. Mr. Scott has been with the Inland sheet mills at Milwaukee since 1925.

E. L. FORSTNER

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E. D. ASHWORTH, of the Bethlehem Shipbuilding Corpn., Ltd., has been made vice-chairman of the Boston chapter of the American Society for Steel Treating.

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HENRY J. GAISMAN, founder of the AutoStrop Safety Razor Co., has been made chairman of the board and chairman of the executive committee of the Gillette Safety Razor Co. C. B. LAMBERT has been appointed president of the company.

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M. G. STERNBERG, formerly general manager of the Hubbard plant of the Continental Steel & Roll Corpn., has been placed in charge of operations of the corporation and HENNING A. FORESBERG, formerly assistant to Mr. Sternberg, has been appointed superintendent of the Hubbard plant, East Chicago, Ind. All engineering departments of the corporation have been combined with headquarters at East Chicago with JAMES THOMPSON, former chief engineer of Hubbard, made chief engineer of the entire organization.

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WILLIAM P. SIEBERT, assistant general manager of sales for the Carnegie Steel Co., Pittsburgh, has retired, following identification with the Steel Corporation since its inception in 1901. He was previously general manager of sales with the old National Steel Co., which became a part of the Carnegie Steel organization at the formation of the Steel Corporation. He has been succeeded by ALBERT M. HARPER, recently manager of Pittsburgh sales for the Carnegie company. Mr. Harper has in turn been succeeded by DENNIS CROWLEY, JR., who has recently been manager of sales for the company at New Orleans.

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CYRIL AINSWORTH has been appointed assistant secretary of the American Standards Association, New York, succeeding F. J. SCHLINK, who resigned after eight years of service to assume technical direction of Consumers Research, Inc., New York, a non-profit organization which acts for the ultimate consumer in the same capacity as a testing laboratory acts for a corporation or for a government department. Mr. Ainsworth has been in charge of the A.S.A. safety code work during the past year, prior to which he served on several national safety code committees. He studied mechanical engineering at Swarthmore College and at the Carnegie Institute of Technology.

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GEORGE V. LANG, auditor and assistant treasurer of the United Engineering & Foundry Co., Pittsburgh, has been elected secretary of the company in addition to his other positions. He succeeds the late George Friesel, who was also treasurer.

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C. F. HERINGTON, for the past nine years in charge of sales engineering and erection of pulverized coal plants for Heyl & Patterson, Inc., Pittsburgh, has opened an office at 1440 Broadway, New York, to specialize in pulverized coal and pneumatic and mechanical handling equipment.

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GIOVANNI SECAGNO, Rome, Italy, is one of a party of 14 Italians participating in the meeting of the International Chamber of Commerce in Washington this week. Prior to his return to his country on May 22, he plans to visit a number of malleable iron foundries, especially those devoted to the manufacture of pipe fittings.

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J. C. MILNER, formerly vice-president of the Canadian division of International Business Machines Corpn., New York, has been made sales manager of the company's new industrial scale division, making his headquarters at the home office.

OBITUARY

EARL H. BROWNING, vice-president of the Ohio Gear Co., Cleveland, died on May 2, after an illness of three weeks. He was born in Dayton, Ind., and was graduated from Purdue University in 1897. He went to Cleveland shortly afterward and became one of the organizers of the Browning Engineering Co. In 1915 he severed his connection with the Browning company and was one of the organizers of the Machine Products Co., which was formed to make munitions. After the war the company changed its line of products and adopted its present name. Mr. Browning was 53 years old.

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WILLIAM F. PRIER, president of the Oregon Brass Works, Portland, Ore., died in that city on April 21, aged 60 years.

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CHARLES W. GREENING, secretary and treasurer, Toledo Machine & Tool Co., Toledo, Ohio, died April 29, after a long illness. He had been with the company for over 30 years, the greater part of that time as secretary and treasurer.

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PAUL HACKENDAHL, one of the founders of Hackendahl & Schmidt Co., pioneer Milwaukee structural and architectural iron works, died April 26, aged 83 years. He was born in Germany, coming to America as a boy, and resided in Milwaukee for 75 years. He retired 15 years ago, having been succeeded as president of the company by his son, William Hackendahl.

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DUNCAN KEITH, vice-president of the Burgess Battery Co., Chicago, died on May 1, after a heart attack. He was 53 years old.

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GEORGE WILSON KYBURG, of the Springfield Package Machinery Co., Springfield, Mass., died at his home in that city on April 29. He was born in Flint, Mich., 69 years ago, and for many years was president of the Thomas S. Condon Co., New York, which, with other wrapping machine companies, make up the Springfield company. He was a past president of the Springfield branch of the National Metal Trades Association.

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ALBERT J. HAZLE, president of the Cornell Belting Co., Chicago, died recently after an operation for appendicitis. He was 68 years old and had been connected with the belting industry for about 50 years.

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DAVID PETER JOHNSTON, president of the Western Screw Co., Chicago, died suddenly on April 20.

HERBERT D. HALL, assistant to the general manager of the Wyman-Gordon Co., Worcester, Mass., died on May 3 after an illness of three weeks. He was born in Grafton, N. H., 57 years ago.

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LELAND R. MITCHELL, assistant chief engineer of the Bath Iron Works Corpn., died May 2, aged 57 years. He was with the Bath Iron Works, Ltd., for 25 years and then became associated with the Bethlehem Shipbuilding Corpn., Ltd., Quincy, Mass. At the reopening of the Bath plant in 1927, he returned there.

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WINFIELD V. MAYNE, manager of the Wickham Bridge & Pipe Co., Council Bluffs, Iowa, died on April 29 in an Atlantic, Iowa, hospital from the effects of injuries sustained in an automobile accident. He was 43 years old.

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A. JOHNSON MONROE of the N. S. Monroe & Sons Co., Arthur, Ill., manufacturers of road-making machinery, died, after a month's illness, on April 27, aged 51 years.

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JOHN WEGNER, JR., sales manager, National Enameling & Stamping Co., Milwaukee, died April 19 from a heart attack. He was born in Milwaukee in 1875 and was associated with the National company 31 years, beginning as a traveling salesman.

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Large Use of Aluminum in Cleveland Work

Aluminum sheets are being used extensively in the construction of the Cleveland municipal stadium. The outside of the grandstand to a width of 44 ft. above the brick wall that encloses the stand is covered with aluminum, which is fabricated in the form of louvres to allow air currents to pass through. The covering is a manganese magnesium alloy in 20 to 14 gages. The metal is crimped to diffuse light and make it stiffer. It is anchored to the steel frame with aluminum screws and bolts. The grandstand ends, as well as the ends of the roof trusses, are covered with aluminum and the four marquise over the entrance are covered with ⅛-in. aluminum plate.

The amount of aluminum used in the construction is 130,000 lb. of sheet metal and 8000 lb. of extruded shapes, castings and plates. Appearance and low cost of maintenance were the principal reasons for the adoption of aluminum. Bids for the aluminum were $22,000 higher than galvanized steel, but engineers estimated that the difference would be largely wiped out by saving in the cost of painting the steel sheets, which was placed at $15,000.

Aluminum is also being used in the construction of two bridges serving as approaches to the stadium. The railing, panels and newels are of cast aluminum made of 5 per cent silicon aluminum alloy, that being chosen as a desirable alloy for that class of work because of its resistance to atmospheric corrosion and its retention of a bright appearance.

While the Cleveland stadium is one of the largest aluminum jobs ever placed in the building field, a still larger amount will be used in covering the train sheds that are being built in Cincinnati by the Cincinnati Union Terminals Co.

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Labor Turnover Rates Show Employment Gains

According to figures gathered by the United States Bureau of Labor Statistics, there were more wage earners added to the payrolls of industry in March than the number separated from the list. For each 100 on the payroll the separation rate was 2.95 per cent and the accession rate 3.67 per cent. Of the separations 1.75 per cent was because of layoff, 0.26 per cent for discharges, and 0.94 per cent voluntary quitting.

These figures vary considerably with the industry. Thus, for iron and steel, the accession rate of 2.03 per cent was less than the separation rate of 2.21 per cent. For automobiles, on the other hand, the accession rate of 7.76 per cent was more than twice the separation rate of 3.19 per cent. Foundries and machine shops showed separations of 3.87 per cent and accessions of 3.38 per cent.

About 1,250,000 employees are covered in this survey, which has gone into representative establishments in 75 industries.

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Open-Web Steel Joists

Simplified practice recommendation R 94-30 relates to open-web steel joists. This has been put out by the Division of Simplified Practice of the United States Department of Commerce and is confined to joists from 8 to 16 in. deep and not longer than 24 times the depth.

In a pamphlet covering this matter, a table gives the allowable total loads on these joists for the varying depths and spans, and in the sections covered within the simplified practice recommendations. There are variations within each depth and span for the maximum end reaction, running from a minimum of 1600 lb. for 8-in. webs to a maximum of 3600 lb. for the 16-in. depth.

Price Levels May Be Permanently Down

BY DR. LEWIS H. HANEY
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

OUR measurements of indicated current requirements for steel continue to move irregularly sidewise. The index declined in March, but was not quite so low as in January, and was similar to that of last November. The net result is a four-month flat spot suggestive of bottom or near-bottom levels. This means that activity in the chief consuming industries has recently been maintained at about the same low level.

Steel output during most of this period was increasing somewhat more than seasonally. With the natural desire of the steel companies to hold their unit overhead expenses down, the impetus apparently came from hopes of the automobile manufacturers, which led to a considerable expansion of production and increased orders for steel. This, and occasional large orders for structural steel, led steel makers to increase their output in anticipation of a more sustained recovery in demand than events have warranted.

Not only has demand from railroads, ordinary building operations, farm implement producers and foreign buyers been very backward; but specifications by automobile makers have not been up to their early promise, and bookings of structural steel in the first quarter were little above the unusually low level of the fourth quarter of 1930.

Accordingly, one would now expect a more than seasonal decline in steel production which should carry the adjusted production curve back considerably closer to the level of the composite demand line on the chart.

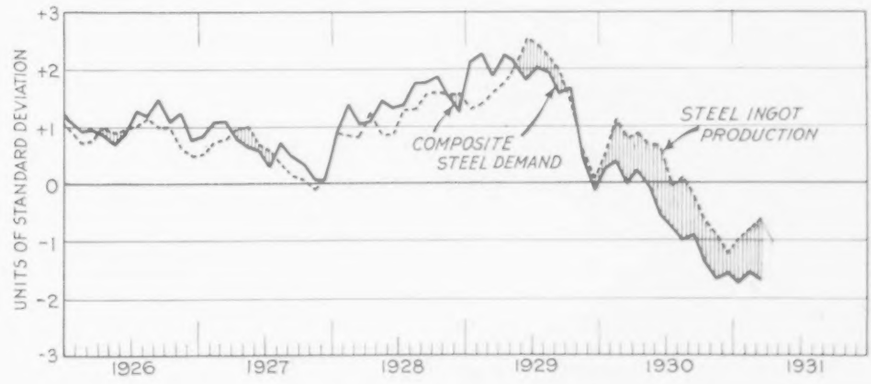
The March decline in the demand curve is the result of reductions in railroad freight transportation, building (floor space), and mining and oil production. A slightly more than seasonal gain occurred in automobile production (largely small cars), in miscellaneous manufactures and in exports (chiefly scrap, shapes and skelp). Agricultural purchasing power and exports of iron and steel continue very low. The result is a preliminary index 76 per cent of the 1921-1927 average, against 78 per cent in February, and 100 per cent a year ago.

Orders for locomotives continue almost absent, while freight car orders, at less than 3000 in April, have been approached in recent years only in 1927. The surplus of freight cars is still large.

After a temporary spurt, building contracts fell back again in mid-April. The seasonal peak of contracts occurs in April and, under present conditions as to surplus floor space, low rents and a dull bond market, we see no early prospect of improvement in speculative building.

New developments seem to be lacking in the automobile field. March registrations were about 32 per cent below a year ago. The problem is to sell cars to people whose purchasing power and will to buy have been reduced by extreme business depression. The seasonal peak of automobile production is at hand, with no reason to doubt that something like the usual seasonal decline will occur.

In general—continued decline in commodity prices (particularly raw materials), the weakness in most bonds, the apparent letdown in machine tool orders and, above all, the prevailing uncertainty as to values, are unfavorable to the steel industry. Buyers' uncertainty as to prices may be attributed chiefly to existing maladjustments. Some commodities are too high. The quicker we realize that the price level is down to stay, and proceed to carry through the process of deflation, the sooner we may expect buyers' confidence to be restored and the resumption of a normal volume of exchanges in commodity markets.



AGAIN the spread between steel production and demand has increased. Recovery cannot be definitely predicted until demand rises above output.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Making Haste Slowly

IN actual accomplishments the Atlantic City meeting of the Chamber of Commerce of the United States failed to measure up to expectations. Advance publicity had suggested that a program for correcting existing economic maladjustments would be announced, or at least that a definite stand would be taken on such issues as wage maintenance, unemployment insurance, industrial coordination and anti-trust law revision. The inaction of the chamber has been roundly criticized.

But the caution of practical business men in appraising currently proposed economic remedies should be no cause for surprise, in view of the failure of the concerted anti-depression drive of a year ago and the complexity of world economic problems as disclosed since that time. Conditions, rather than theories, are dictating the policies of business, and there is a growing realization that there are distinct limitations on what can be done in the face of the cyclical tide.

It has become clear that wages cannot be maintained by mere fiat. Most employers are cutting wage rates as a last resort, but the fact cannot be overlooked that a steadily increasing number of them are facing that necessity.

Unemployment insurance was discussed at length at Atlantic City and was disclosed as falling far short of being a major solution for industrial idleness.

Stabilization of industry was studied from various angles, but American business men are reluctant to pay the price of complete coordination of production, consumption and plant expansion. National industrial control of this type implies the stifling of individual initiative, the fixing of prices and finally their regulation by the State. Few manufacturers are yet ready to accept a utility status as necessary to them or in the interests of public welfare.

Similarly there is distrust of a liberalization of anti-trust laws, because it is felt that such a step would lead to oppressive Governmental restrictions. Moreover, there is a lack of faith in the whole cartel conception, whether it is under the direct or indirect sponsorship of the State. Attempts at artificial control of rubber, sugar, coffee, cotton, wheat and copper do not encourage further experiments in this kind of economic tinkering.

Of course, it is possible that there are good and bad cartels, as Jean Parmentier, director of the Credit Foncier of France, argued before the International Chamber of Commerce at Washington this week. But it is evident that Americans, at least, still have much to learn about industrial coordination and other radical economic departures before adopting them.

As President Butterworth of the United States Chamber well said in defining the policy of his association, "This chamber is not an organization that hastily adopts new, patent cure-alls in attempting to work out improvement from economic ills. Our methods are time-tested for obtaining a truly representative judgment based upon impartial, non-partisan, honest consideration of facts."

On Prices

IN the course of the present economic depression we have been able to make several observations in respect to prices, some of which are the following:

Commodity prices below the direct cost of production, and far below the true cost, do not *ipso facto* check production, which may continue so long as credit exists. Production is maintained at the expense of principal and may be prolonged to the state of ruin.

Excessively low prices, so resulting, do not *ipso facto* increase consumption. The low prices for wheat and petroleum have not had that effect.

The excessive decline in commodity prices is a consequence of competition among producers for a volume of business that is contracted by other factors. Companies in control of non-ferrous metals like aluminum and nickel maintained their prices and made about the same proportion of sales in 1930, in comparison with 1929, as were made by the producers of copper, whose price was cut to the lowest figure in many decades.

The maintenance of production and the pressure to sell competitive commodities has emanated especially from small producers. The inability to form cartels in lead and zinc (abroad) has been ascribable to the difference in views between integrated producers and custom smelters. The complaint in copper has been the operations of custom smelters. In the prorating of petroleum the 10-bbl. producer has been exempt. The wheat-grower refuses to curtail his production. The small producer appears to be willing to reduce his scale of living, if others are not.

We offer this statement of facts without any argument or deductions, which may be left to economists. In them they will find plenty of opportunity for study.

Coal and Other Problems

MODIFICATION of the anti-trust laws has been suggested in favor of the coal industry more often perhaps than in connection with all other commercial activities combined. Frequently the argument has proceeded along the line that an "exception" should be made of coal. Lately, however, other industries have felt the pinch, and the idea is growing that if nothing is done there will be many in much the same plight. The "coal problem" could be duplicated very widely.

One point about which there has been some mis-

apprehension may be stressed. Remarkable economies have been effected in the use of coal in the last dozen years; but an inference that this particular thing has taken a market away from the bituminous coal producers is not correct, at least to any material extent. What it did was to prevent the coal industry from getting a wider market, for in a general way the savings effected have been employed to produce more power, not to reduce the consumption, and that statement still holds good when allowance is added for increasing industrial activity year by year, as will now be made clear. The actual loss to the bituminous coal industry is through the competition of petroleum, natural gas and water-power.

A Bureau of Mines statement shows total consumption of bituminous coal in the United States, 1917 to 1930 inclusive. The Federal Reserve Board's index of industrial production, manufacturing and mining, is available beginning with 1919—based on 1923 to 1925 as 100. For the table a computation is made of bituminous coal consumption with the same base. Then the industrial index is divided into the coal index to show the ratio of coal to general activity.

Ratio of Bituminous Coal to Industrial Activity

	Coal Relatives	Industrial Relatives	Coal Ratio
1919	96.2	83	116
1920	101.6	87	117
1921	78.3	67	117
1922	85.3	85	100
1923	103.6	101	103
1924	96.7	95	102
1925	99.7	104	96
1926	106.4	108	99
1927	99.8	106	94
1928	99.6	111	90
1929	103.8	119	87
1930	89.7	97	92

One might suppose that domestic coal consumption would run with relative uniformity, in good and bad years, against variations in industrial and railroad consumption, but such is not the case. The coal ratio did not rise materially in off years.

There is a decrease of 27 points, or 23 per cent, from the average of 1919-1921 to the average of 1928-1930. Why? There is a ready means of checking. Computations have been made of total power available, by reducing bituminous coal, anthracite, petroleum and natural gas to heat units and adding an allowance for water-power. In 1919 and 1920 bituminous coal averaged 65.6 per cent of the total of these power resources, while in 1929 and 1930 it averaged about 51 per cent. This decrease in proportion is just about equal to the decrease in the coal ratio shown above.

That is, if it had not been for the growing competition of oil, gas and water, bituminous coal consumption would have very nearly held its own relative to general industrial activity. This means that industry has been employing more power year by year, relative to its output, and getting the additional power by economizing in the use of fuel. More economical use of coal has not taken a market away from the coal producer; it has simply deprived him of a growth in the market.

Automobile Proportion of Steel Made

STEEL producers have felt lately that the automobile trade was one of their poorest customers, taking much less than the usual proportion of all the steel made. This is true, although not to so great an extent as is felt in some quarters. It is owing to automobile production running very strongly to the light cars, and to there being a particularly large decrease in parts for foreign assembly and parts for replacement.

In 1928 automobile production was 4,601,141 units and steel ingot production 50,325,393 tons, while the annual finding of THE IRON AGE showed 18 per cent of the steel going to the automotive industry. For 1929 the figures were 5,621,715 cars and trucks, 54,850,433 tons of ingots, 18 per cent of the steel; for 1930, 3,510,178 cars and trucks, about 40,000,000 tons of ingots, and a proportion of 15½ per cent.

By no means does all the steel reported for the automotive industry go into the cars and trucks reported as produced, but one may nevertheless strike a proportion which will do approximately for a working rule. For 1928 the equivalent of about 2 tons of ingots went to the automotive industry per car or truck made, while for 1929 the proportion dropped to about 1¾ tons, and the same was shown for 1930.

To apply this information properly, however, it is necessary to consider seasonal variation. There are official statistics of automobile and steel production for the first three months of this year and comparison should be made with other first quarters. Segregating the first quarter from the whole year, it appears that in the first quarter of 1928 there was actually a trifle under 16 per cent, against 18 per cent for the year; in 1929 there was a little over 19 per cent against 18 per cent for the year; and in 1930 there was 15 per cent against 15½ per cent for the year.

These divergences are readily explained. In the first quarter of 1928 steel production ran heavy, but automobile production was below its usual proportion to the year's total. In 1929 automobile production ran heavy in the first quarter relative to the year, while steel pursued a course more like its usual one. In 1930 both automobile and steel production were much heavier in the first quarter than a normal proportion to the year's total.

Applying the factor, shown alike for 1929 and 1930, of steel produced for the automotive industry relative to number of cars and trucks produced, to the statistics of the first quarter of this year it would appear that the automotive industry absorbed 15 per cent of the steel made. This is about the same proportion as obtained in the first quarter of last year or in the year as a whole, but is well below the 19 per cent in the first quarter of 1929 and 18 per cent in all of 1929.

Thus the proportion would seem to be off from year before last, but not off from last year. This arithmetical showing must be scaled down, however, by reason of the greater preponderance of light cars this year and by special declines in production of parts and accessories.

As to the pace that automobile production pursues during a year, it may be mentioned that in the

five years through 1928 first-quarter production averaged 25.0 per cent of the year, in 1929 it ran 27.5 per cent and in 1930 it was 29.8 per cent. Each of those two years had a particularly poor ending, so preceding experience is more in point, and there are many who hope that this year's total will be more than four times the first quarter, when production was 697,491 units.

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On Wealth

OF the maldistribution of wealth Senator Couzens and Senator La Follette and others complain. They advocate redistribution via increased surtaxes and inheritance taxes. We conceive that their ideas of this subject are extremely vague.

The present population of the American people is about 124,000,000. This means about 31 million families, whereof somewhat more than six million live on farms.

The present wealth of the American people according to Ingalls is 400 to 450 billion dollars, in inflated terms. The National Industrial Conference Board estimates about 362 billion.

The value of the farms is about 75 billion. The value of urban and suburban real estate, which is largely owned by its occupants, is larger than that. The value of the steam railways may be 30 billion, although the Interstate Commerce Commission is strongly averse to so high an allowance. All of the other public services would come inside of another 30 billion. The stock of consumable goods is a large item in the inventory, perhaps 60 to 70 billion. The bullion—gold and silver—is a small item, less than five billion. Gems and precious stones may come to three billion.

Much of this property is owned by corporations, whose aggregate market value in 1929 may have been 150 billion, but now is much less. Of course this reckoning duplicates physical inventory, but to no appreciable extent does it duplicate farm values, and to only a moderate extent urban and suburban property.

There is inequality in the distribution of wealth. The six million farmers and the more millions of urban and suburban dwellers, even if they have mortgages on their homes, and the many millions who own stock in railway, mining, manufacturing and public service corporations, are immeasurably better off than those who do not own anything, but how is redistribution to be effected short of communism? If communism, then consider the experience of Russia where is spelled the destruction of wealth and the terrible pain of recreating it, for that is what the five-year plan means.

The illusion that misleads Senator Couzens and Senator La Follette is that some persons enjoy very large incomes, as are reflected by the income tax returns. These result from a variety of ways, e. g., (a) accidentally, as in the instance of Senator Couzens himself, who was a fortunate investor in shares of the Ford Motor Co.; (b) from speculative profits which are likely to be offset by speculative losses; (c) from thrift in acquiring and holding property, (d) and from genius in creating income, which is probably the most prolific source.

In general these acquisitions of income do not deprive the body politic of anything that it would otherwise get. The Ford motor has been a blessing to the people even if Henry Ford and Senator Couzens have derived large incomes from it. The curtailment of such income by surtaxing it for wasteful expenditure through governmental agencies does not benefit anybody; rather does it harm. Surtaxing and other forms of confiscation are one of the evils that have led up to such economic depression as we are now experiencing.

CORRESPONDENCE

Baling of Light Scrap

To the Editor:—In the April 23 issue of THE IRON AGE, in a report of the meeting of the American Society of Mechanical Engineers at Cleveland, on the subject of handling sheet scrap, reference is made to the writer's remarks in the discussion thereon, wherein I have stated that the baling of scrap is becoming less and less attractive to the scrap yard operators.

This would, of course, imply that I do not advise the scrap yard operator to install baling press equipment, which is naturally contrary to our aim in advertising. What the writer actually stated is that the baling of new sheet clippings is becoming less and less attractive to the scrap yard operators and, therefore, they are turning to the baling of old scrap, such as abandoned automobiles, metal furniture and other sheet-metal products, which I highly recommended as a very important means toward conservation of our natural resources.

H. JACOBSON,
Chief engineer,
Galland-Henning Mfg. Co.

Milwaukee, April 27.

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Pressed Metal Work in Making Radio Parts

(Concluded from page 1521)

air supply line. The single-valve control provides quick adjustments without fuel waste.

Magnetism of Steel Cores Drawn in Furnaces

While the furnaces are used primarily for heat treatment—annealing, hardening, normalizing, carburizing, case hardening or tempering—one of the other uses for these units in the Stromberg-Carlson plant is to draw the magnetism from steel cores. The relay cores for telephone switchboards must be annealed to rid them of their residual magnetism. They are first packed in steel boxes and then the boxes are put in air tight annealing pots which are sealed with fireclay. Inside the pots and around the steel boxes is placed a quantity of cast iron chips to assure further against oxidation.

The pots are then placed in the furnace and heated to 1525 deg. F. for six hours. The method used is to bring the furnace and pots up to temperature in the evening, shut off the burners and leave the furnace closed overnight. Loud speaker magnets are hardened in these furnaces.

Pig Iron Production Up 2.7 Per Cent in April

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STEEL Ingot Output Tapers to 47 Per Cent Rate—Large Pipe Line Awards—Further Break in Scrap Prices

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AGAIN in pig iron output in April, sustained activity in the automobile industry, growing demands for pipe lines and other construction projects, and indications that the downtrend of steel production is encountering greater resistance are favorable developments in a highly sensitive iron and steel market. Offsetting factors include a net loss of three active blast furnaces in April, a further decline in scrap prices and continued tapering of tin plate and rail production.

THE increase in pig iron output, the fourth consecutive monthly gain, was 2.7 per cent on a daily basis. Production for the 30 days of April was 2,019,529 tons, compared with 2,032,248 tons for the 31 days of March, and the daily averages were 67,317 tons and 65,556 tons respectively. Despite the improvement the April rate was the lowest for that month since 1921 and with that exception the lowest since 1909. Furnaces in blast on May 1 totaled 113, against 116 on April 1.

VARIATIONS in steel ingot output have become so small as to make weekly estimates exceedingly difficult. Valley operations now range from 35 to 40 per cent and there have been slight losses in Birmingham and eastern Pennsylvania. On the other hand, Buffalo output has gained and production in other important centers is unchanged. The average for the country at large is placed at 47 per cent as compared with about 48 per cent a week ago. The Steel Corporation rate is estimated at two to three points higher than that of the entire industry.

AUTOMOBILE production in April more than fulfilled THE IRON AGE estimate of 330,000 cars. The total for all makers outside of Ford, as reported by the National Automobile Chamber of Commerce, was 231,017 units (for this country and Canada), a gain of 20 per cent over March. Ford output in April was 117,891 cars, compared with 99,035 in the previous month. Information regarding current Ford operations is rigidly guarded, but May schedules of other companies show little change from those of April.

PIPE line awards total 53,000 tons. The Electric Bond & Share Co. has placed 35,000 tons of 20-in. for a gas line in Montana with the A. O. Smith Corpn. and the Ohio Oil Co. has ordered 9000 tons from the same fabricator. The Atlantic Refining Co. has awarded 9000 tons for a Pennsylvania gasoline line to the National Tube Co. Many new projects have come into the market and, in addition, orders are now being placed for feeder pipe for large lines laid in 1930.

Prospective oil storage tank business, due mainly to the bringing in of wells in the new east Texas field, totals 40,000 tons. Demand for small tanks, used for filling stations and oil burner units, has increased sharply and a Chicago district fabricator of such containers is now operating 24 hr. a day. Steel for the Hoover Dam, 25,000 tons, is now being placed. An order for 1000 tons of rock drill steel was given to the Crucible Steel Co. of America, and some of the remaining material has been bought. Most of the tonnage required is reinforcing steel.

FABRICATED structural steel awards, at 35,000 tons, compare with 13,000 tons a week ago. New projects total 39,000 tons, including 16,000 tons for a building in Chicago for the Marshall Field Estate.

The Missouri Pacific has purchased 15,000 tons of rails, and recent specifications include a release of 5000 tons from the Chicago & North Western.

The downtrend of scrap prices has not been halted. At Pittsburgh, heavy melting grade has declined 75c. a ton to $11.50, delivered, the lowest figure since 1914. The same grade is off 50c. at Detroit and 25c. at Chicago and St. Louis. THE IRON AGE composite price for heavy melting steel has receded from $10.67 to $10.33 a ton, the lowest level since the early weeks of 1915.

BLACK sheets and steel furniture stock have declined $2 a ton to 2.15c. and 3.40c. a lb., Pittsburgh, respectively. The new sheet classification recently prepared by the American Rolling Mill Co. will probably win wide adoption but will not go into full effect until the third quarter. Makers of standard pipe have revised discounts slightly on direct shipments to consumers to correct a confused price situation. Silvery prices have broken $2 a ton and by-product foundry coke at Chicago is off 50c.

THE IRON AGE composite price for finished steel has receded from 2.128c. to 2.114c. a lb., its lowest since May, 1922. Pig iron is unchanged at $15.79 a ton.

PITTSBURGH

Mills View Steel Outlook as Uncertain—Heavy Steel Scrap in Sharp Decline

PITTSBURGH, May 5.—In the almost complete lack of new developments which has characterized the steel market for the last two or three weeks, sentiment in this district continues to be unfavorable and the outlook for the next few months is uncertain. The heavy building industry is gradually increasing its steel requirements, and the prospect for line pipe orders continues promising. On the other hand, agricultural consumption of steel products, as indicated by orders for wire and fencing, galvanized sheets and other items, holds little promise, and the prospect for the manufacturing industries is clouded. Automobile production may have reached its peak for the year last month, and the other large steel-consuming groups have not departed from their policy of ordering in small lots for immediate shipment, with little indication of their future needs.

The outlook for the summer is still a matter of speculation, but it now seems very unlikely that the usual seasonal trend will be interrupted by any upward movement in orders or production before fall.

Steel ingot production in the Pittsburgh district has not changed substantially in the last week, but a few independent open-hearth furnaces have gone out. Operations have fallen slightly under 45 per cent of capacity, while further curtailment in the Valleys has brought output in that important center to about 35 per cent. In the Wheeling district production stands at about 50 per cent. Production of finished steel products has held fairly well except in the case of tin plate, where the rate of output has dropped under 75 per cent. Sheet mills continue at about 40 per cent, with strip production scarcely as high. In the other important finished steel products, activity seems to have been scaled down to meet current needs, although some further curtailment in output of rails and track accessories is indicated by early releases for May shipment.

Steel prices are getting little test in the almost entire lack of substantial buying. Consumers who are purchasing only for their immediate needs are not objecting to current market quotations and contract buyers are satisfying their requirements in some cases on contracts taken at lower figures. This is particularly true in the case of bars, plates and shapes, on which the current market is fairly well maintained at 1.65c., Pittsburgh. Makers of standard pipe have revised discounts slightly on direct shipments to correct a somewhat muddled price situation.

A sale of No. 1 heavy melting steel at $11.50, delivered, has brought scrap quotations to the lowest level since 1914. In spite of the sharp declines in open-hearth scrap, blast furnace material is strong on the basis of several purchases evidently intended as an experiment to reduce pig iron costs. The pig iron market continues very dull.

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Steel market is lacking in developments of an encouraging character.

* * *

Outlook is clouded in uncertainty, with few signs of upward trend before fall.

* * *

Pipe line projects and building construction offer most promising prospects for tonnage.

* * *

Trend of operations continues slightly downward, with decline most marked in Youngstown district.

* * *

Sale of heavy melting steel at $11.50 marks $1 a ton drop from previous tonnage sale, and brings price to lowest point since 1914.

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SEMI-FINISHED STEEL

Shipments in April were somewhat lower than in the preceding month, reflecting the lighter operations of the non-integrated sheet and strip mills. No new buying is reported. The market on billets, slabs and sheet bars continues at $30, Pittsburgh. Forging billets are quoted at $36, with occasional sales at this level. Shipments of wire rods to the bolt and nut makers are generally lighter, and new buying is negligible. Small lots have been sold at $37 in a few cases, with $35 the price on most contract business.

PIG IRON

The Westinghouse Electric & Mfg. Co., East Pittsburgh, is asking for bids on its second half requirements of foundry iron. No other new inquiry is reported, and shipments against old contracts are still declining. Prices are unchanged at recent levels, with scarcely any opportunity for a market test.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$16.50 to $17.00
Bessemer	17.00
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.00
Low phos., copper free	26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	$17.00 to $17.50
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Bessemer	17.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

RAILS AND TRACK ACCESSORIES

Early specifications for May delivery of track accessories are somewhat lighter than they were a month ago. Shipments during April exceeded those of March, but reports indicate that there will be a falling off this month. Production of both rails and accessories has shown little curtailment as yet, although some downward revision is expected.

BARS, PLATES AND SHAPES

With releases on structural material and reinforcing bars gradually improving, and general demand for the heavy hot-rolled products showing no further curtailment, the market outlook seems somewhat more favorable than it was at this time last month. The bar capacity of the district is engaged at about 40 per cent of capacity, with shape production holding at a considerably better rate. Demand for plates from the car builders is very light, and little material is being taken for fabricated tanks. A steady demand from the barge builders continues, and prospective business of this type looks very favorable. Structural awards in the immediate Pittsburgh district are light, but Pittsburgh producers are getting some business out of the East, which helps to maintain operations. Fabricating shops are not very well engaged, and business is spotty. A fair number of large projects are on company books, but small work is lacking. Shipments of reinforcing bars so far this year compare favorably with those of the corresponding 1930 period. State and municipal work is accounting for a larger percentage of the tonnage this year. The price of reinforcing bars has been subject to some irregularities on large tonnages, but most of the weakness is traceable to shading of extras by distributers. Mills are making little effort to get more than 1.65c., Pittsburgh, on the general run of business. Cut lengths take the usual $5 a ton premium. Producers of all heavy hot-rolled products are still trying to establish a 1.70c. price on current tonnage, but this figure has thus far been effective principally on very small lots and

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	May 5, 1931	Apr. 28, 1931	Apr. 7, 1931	May 6, 1930
No. 2 fdy., Philadelphia	*$17.26*	$17.76	$17.76	$20.26
No. 2, Valley furnace	17.00	17.00	17.00	18.50
No. 2 Southern, Cin'ti	*14.69*	14.19	14.19	16.69
No. 2, Birmingham	12.00	12.00	12.00	14.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	19.00
Basic, del'd eastern Pa.	17.00	17.00	17.25	18.75
Basic, Valley furnace	16.50	16.50	16.50	18.50
Valley Bessemer, del'd P'gh.	18.76	18.76	18.76	20.76
Malleable, Chicago*	17.50	17.50	17.50	19.00
Malleable, Valley	17.00	17.00	17.00	19.00
L. S. charcoal, Chicago	25.04	25.04	25.04	27.04
Ferromanganese, seaboard	80.00	80.00	80.00	94.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	30.00	30.00	30.00	33.00
Sheet bars, Pittsburgh	30.00	30.00	30.00	33.00
Slabs, Pittsburgh	30.00	30.00	30.00	33.00
Forging billets, Pittsburgh	36.00	36.00	36.00	38.00
Wire rods, Pittsburgh	35.00	35.00	35.00	36.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.65	1.65	1.65	1.80
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.65	1.65	1.65	1.75
Bars, Chicago	*1.70*	1.75	1.75	1.85
Bars, Cleveland	1.70	1.70	1.70	1.80
Bars, New York	1.98	1.98	1.98	2.09
Tank plates, Pittsburgh	1.65	1.65	1.65	1.75
Tank plates, Chicago	*1.70*	1.75	1.75	1.85
Tank plates, New York	1.93	1.93	1.93	2.02½
Structural shapes, Pittsburgh	1.65	1.65	1.65	1.75
Structural shapes, Chicago	*1.70*	1.75	1.75	1.85
Structural shapes, New York	1.90½	1.90½	1.90½	1.94½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh	1.55	1.55	1.55	1.70
Cold-rolled strips, Pittsburgh	2.15	2.15	2.25	2.55

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	May 5, 1931	Apr. 28, 1931	Apr. 7, 1931	May 6, 1930
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh.	*2.15*	2.25	2.25	2.55
Sheets, black, No. 24, Chicago dist. mill	2.35	2.35	2.35	2.65
Sheets, galv., No. 24, P'gh.	2.80	2.80	2.85	3.30
Sheets, galv., No. 24, Chicago dist. mill	2.90	2.90	2.95	3.40
Sheets, blue, No. 13, P'gh.	2.00	2.00	2.05	2.15
Sheets, blue, No. 13, Chicago dist. mill	2.10	2.10	2.15	2.25
Wire nails, Pittsburgh	1.90	1.90	1.90	2.15
Wire nails, Chicago dist. mill	1.95	1.95	1.95	2.20
Plain wire, Pittsburgh	2.20	2.20	2.20	2.30
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.35
Barbed wire, galv., P'gh.	2.55	2.55	2.55	2.80
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	2.85
Tin plate, 100 lb. box, P'gh.	$5.00	$5.00	$5.00	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh.	*$11.50*	$12.25	$12.75	$15.75
Heavy melting steel, Phila.	10.25	10.25	10.50	13.50
Heavy melting steel, Ch'go.	*9.25*	9.50	10.00	12.75
Carwheels, Chicago	9.50	9.50	9.50	14.00
Carwheels, Philadelphia	12.50	12.50	13.00	15.00
No. 1 cast, Pittsburgh	*11.75*	12.25	12.50	14.25
No. 1 cast, Philadelphia	11.50	11.50	11.50	14.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.50	13.25
No. 1 RR. wrot., Phila.	11.00	11.00	12.00	15.00
No. 1 RR. wrot., Ch'go (net)	*7.50*	8.00	8.25	11.25
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.50	$2.50	$2.50	$2.60
Foundry coke, prompt	3.50	3.50	3.50	3.50
Metals				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	9.87½	9.87½	10.12½	13.12½
Electrolytic copper, refinery	8.75	9.25	9.50	12.25
Tin (Straits), New York	*23.25*	23.75	25.85	32.00
Zinc, East St. Louis	*3.25*	3.40	3.95	4.65
Zinc, New York	*3.60*	3.75	4.30	5.00
Lead, St. Louis	*3.80*	3.90	4.25	5.35
Lead, New York	*4.00*	4.10	4.50	5.40
Antimony (Asiatic), N. Y.	*6.70*	6.85	7.00	7.50

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

mixed carloads. Shipments against contracts are generally at lower prices. With 1.60c. representing a minimum, a much larger percentage of orders are at 1.65c., particularly in the case of bars.

COLD-FINISHED STEEL BARS

April business fell considerably behind March with many producers, and specifications so far this month have not improved. The price is well maintained at 2.10c., Pittsburgh.

TUBULAR GOODS

None of the large pipe line projects recently reported pending has been closed, but market activity is still brisk, and producers feel that a number of lines cannot be delayed much longer if the work is to be completed this year. Mills are getting some tonnage in feeder pipe for the large projects let in 1930. The Shell Oil Corpn. is soon expected to buy 200 miles of 10-in. pipe for use at an undisclosed point. Demand for buttweld pipe is still exceedingly dull for this season of the year. Mills have revised prices on standard pipe for direct shipment, although discounts to the jobbing trade are unchanged. Movement of oil country goods has shown a slight increase in the last few days, and boiler tubes are a bit more active.

WIRE PRODUCTS

Fair demand for merchant products, especially fencing, continues from the jobbing trade in agricultural regions, but manufacturers' wire is very quiet. Declining automobile specifications have brought this about to some extent, but other consuming industries are also restricting their orders. Nails, which are very dull, are quoted at $1.90 a keg, Pittsburgh, and manufacturers' wire is unchanged at 2.20c., Pittsburgh. Some makers are still trying to get prices $2 a ton higher, but these figures have been by no means established.

SHEETS

Demand for sheet steel products has not changed in the last week and attention in the trade is centered on the new price schedules announced a short time ago. Several leading producers have signified their intention of adopting the new selling plan, and it is expected that the entire industry will soon follow. Large consumers regard the changes favorably, as their purchasing will be considerably simplified. With the above changes being made, current prices have not changed materially and buying is so light that it will be some time before prices on the new schedules will be fully effective.

May schedules of the automotive industry, as reflected in releases on sheets, do not indicate a gain in output of cars this month. Sheet demand from other sources is generally light, with the exception of galvanized sheets for roofing and culvert stock. The agricultural industry is doing little buying, and jobbers in many sections are rather discouraged at the prospect. Among the manufacturing industries who are large consumers of sheets, makers of electric refrigerators have probably maintained their requirements as well as any. A fair

THE IRON AGE COMPOSITE PRICES

	Finished Steel	Pig Iron	Steel Scrap
May 5, 1931	2.114c. a Lb.	$15.79 a Gross Ton	$10.33 a Gross Ton
One week ago	2.128c.	15.79	10.67
One month ago	2.128c.	15.79	11.08
One year ago	2.228c.	17.67	14.00
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel: High	Finished Steel: Low	Pig Iron: High	Pig Iron: Low	Steel Scrap: High	Steel Scrap: Low
1931	2.142c., Jan. 13	2.114c., May 5	$15.90, Jan. 6	$15.71, Feb. 17	$11.33, Jan. 6	$10.33, May 5
1930	2.362c., Jan. 7	2.121c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

movement of steel furniture sheets continues.

TIN PLATE

Specifications were lighter last week with some producers. Production of the leading interest dropped under 75 per cent. Curtailment is also reported from some of the large independent companies. Operations of the industry as a whole average slightly less than 75 per cent. Shipments, on the other hand, are still increasing and the larger companies are benefiting by releases on material produced earlier in the year in anticipation of the heavy summer requirements of the large container manufacturers.

STRIP STEEL

Releases of both hot and cold-rolled strip are still discouragingly light, but April shipments of many producers did not fall as much under March as had been anticipated. Some makers believe that demand may not fall much lower during May, but scarcely anyone is willing to predict an increase. Much will naturally depend upon the automobile industry. Demand from other sources has not changed materially. Prices seem to be holding at recent levels, with cold-rolled strip quotable at 2.15c. to 2.25c., Pittsburgh, and hot-rolled at 1.50c. to 1.55c. and 1.60c. to 1.65c.

COKE

This market is duller than heretofore. Scarcely any selling of the furnace grade is reported, but the price in this territory is holding at $2.50, Connellsville. Shipments of foundry coke are about 25 per cent of normal, with little change in prospect. Prices are weak, with considerable distress material offered from time to time.

OLD MATERIAL

The scrap market has declined sharply on the basis of a substantial sale of No. 1 heavy melting steel at $11.50. This is a decline of $1 a ton from most recent purchases, and brings the market to the lowest level since 1914. Dealers are having little trouble picking up steel at as low as $11.25, but it is unlikely that large tonnages could be bought at less than $11.75. Most of the other grades of scrap have declined in sympathy with steel, although blast furnace material is very strong on the basis of heavy buying by at least three consumers. A sale reported last week at better than $8 has been followed by further smaller purchases at $7.75 and $7.50. No activity is reported in the other grades of scrap, and dealers are unable to sell odd cars without considerable difficulty.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$11.25 to $11.75
No. 2 heavy melting steel	9.75 to 10.25
Scrap rails	11.00 to 11.50
Compressed sheet steel	11.25 to 11.75
Bundled sheets, sides and ends	9.00 to 9.50
Cast iron carwheels	11.50 to 12.00
Sheet bar crops, ordinary	12.50 to 13.00
Heavy breakable cast	9.00 to 9.50
No. 2 railroad wrought	11.25 to 11.75
Hvy. steel axle turnings	10.00 to 10.50
Machine shop turnings	6.75 to 7.25
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	14.50 to 15.00
Railr. coil and leaf springs	14.50 to 15.00
Rolled steel wheels	14.50 to 15.00
Low phos. billet and bloom ends	15.50 to 16.00
Low phos. mill plates	13.50 to 14.00
Low phos. light grades	13.50 to 14.00
Low phos. sheet bar crops	14.50 to 15.00
Heavy steel axle turnings	10.00 to 10.50
Electric Furnace Grades:	
Low phos. punchings	14.50 to 15.00
Heavy steel axle turnings	10.00 to 10.50
Blast Furnace Grades:	
Short shoveling steel turnings	7.50 to 8.00
Short mixed borings and turnings	7.50 to 8.00
Cast iron borings	7.50 to 8.00
Rolling Mill Grades:	
Steel car axles	17.00 to 17.50
Cupola Grades:	
No. 1 cast	11.50 to 12.00
Rails 3 ft. and under	13.50 to 14.00

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.75c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	3.10c.
Hoops	4.10c.
Black sheets (No. 24), 25 or more bundles	3.25c.
Galv. sheets (No. 24), 25 or more bundles	3.60c.
Light plates, blue annealed (No. 10)	2.75c. to 3.00c.
Blue annealed sheets (No. 13)	2.90c. to 3.05c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.82c.
Spikes, large	2.65c.
Small	2.90c. to 3.05c.
Boat	3.15c.
Track bolts, all sizes, per 100 count,	60 and 10 per cent off list
Machine bolts, 100 count,	60 and 10 per cent off list
Carriage bolts, 100 count,	60 and 10 per cent off list
Nuts, all styles, 100 count,	60 and 10 per cent off list
Large rivets, base per 100 lb.	$3.30
Wire, black, soft ann'l'd, base per 100 lb.	2.40
Wire, galv. soft, base per 100 lb.	2.85
Common wire nails, per keg	$2.10 to 2.15
Cement coated nails, per keg	2.15

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

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Heavy Melting Scrap 50c. Lower at Detroit

DETROIT, May 5.—Heavy melting steel has declined 50c. a ton, and several other items have been depressed 25c. in the past week. However, in the absence of sizable transactions, prices are largely nominal. Dealers are of the opinion that quotations will stay at or near present levels in the immediate future.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$8.00 to $8.50
Borings and short turnings	3.50 to 4.00
Long turnings	2.75 to 3.25
No. 1 machinery cast	9.00 to 9.50
Automotive cast	11.00 to 11.50
Hydraul. comp. sheets	7.50 to 8.00
Stove plate	6.50 to 6.75
New No. 1 busheling	6.50 to 7.00
Old No. 2 busheling	2.50 to 3.00
Sheet clippings	4.75 to 5.00
Flashings	7.00 to 7.50

CHICAGO

Steel Specifications Take Turn Upward—Two Steel Mill Blast Furnaces Out

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Sharp spurt in steel specifications, largely in bar mill products.

* * *

Ingot output, at 50 per cent of capacity, on better foundation.

* * *

Structural steel inquiries, at 35,000 tons, heaviest for one week in many months.

* * *

Two steel mill blast furnaces blown out. Large scrap accumulations a governing factor.

* * *

Scrap prices take a further dip, with heavy melting steel at average of $9.25.

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CHICAGO, May 5.—Specifications for finished steel products are comparable with the best so far this year, and ingot production is probably better entrenched at 50 per cent of capacity than in the late days of April. Releases of rails are not dominant, nor does skelp for line pipe manufacture play an important part. The better showing of specifications is largely in bars, though structural demand is quickening. Shipping instructions for bars and hot strips from automobile manufacturers and parts makers are taking a leading part in not only sustaining ingot production but in some directions affording a slight advancement.

For the first four months of the year, the bar tonnage did not assert its usual position in relation to other finished steel products. However, the past two weeks have witnessed a change in this situation, and bar mill products are now in the vanguard.

The contract for the Outer Drive bridge, Chicago, has been placed. This project calls for 7000 tons of steel, but also of importance is the fact that this is the first link in a development which will take well over 20,000 tons. Fresh inquiries at 35,000 tons are the heaviest this district has had in many months.

News in the railroad field is limited to rail orders placed by the Missouri Pacific, an inquiry for 500 underframes for the Northern Pacific and a large tonnage of steel for an overhead crossing for the Santa Fe. Local car shops will complete about May 15 the last of the cars awarded by the Santa Fe.

Accumulations of pig iron and the large supply of scrap, as well as the low prices for scrap, have resulted in the blowing out of two steel mill blast furnaces. The scrap situation is the most important factor, since all steel producers have large accumulations, one of which is said to exceed 300,000 tons. There now are 14 of 36 steel mill blast furnaces in service.

PIG IRON

There are no developments of major importance in this market. Four merchant stacks remain in blast, but their output is far below rating. Consumption remains steady for the district as a whole, with spots here and there where demand is heavier. In western Michigan, for instance, several gray iron foundries report better business from machinery builders and the hardware trade. New buying is spotty, with little variation either up or down, thereby giving added proof that consumers are cautiously gaging pig iron commitments by the size of their order books. Prices are steady, except for silvery, on which at least $2 below recent quotations is common. The 10 per cent grade is being offered at $21, furnace.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	$25.04 to 27.04
S'th'n No. 2 fdy.	17.01
Low phos., sil. 1 to 2, copper free	28.50 to 29.20
Silvery, sil. 8 per cent	24.79 to 26.79
Bess. ferrosilicon, 14-15 per cent	35.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

FERROALLOYS

Shipments of these commodities into western Michigan are steady, but deliveries are slightly smaller to Chicago district steel mills. Both inquiries and new orders are very light.

PLATES

Oil producers in the new east Texas field continue to bring in new wells, and there is much speculation in the Chicago plate market as to the effect this will have on tank orders. In fact, preliminary steps are being taken to satisfy the needs of that district, but formal inquiries are lacking pending a scheme for proration which the State of Texas may impose. Business in small tanks, such as are used for filling stations and oil burner units, is turning up rather sharply, one fabricator in this district having recently gone on 24 hr. a day operations. The prospect for new business in line pipe steadily improves from the viewpoint of plans being prepared. The Panhandle-Illinois Pipe Line Co. has been granted permission to lay a 22-in. main across Illinois, from which it will distribute natural gas to about 100 communities in the south central part of the State. New projects calling for an expenditure of more than $35,000,000 are in prospect in the Rocky Mountain region. The Montana Power Co. plans to pipe gas from Alberta, Canada, to Helena and Butte, Mont. The Ohio Oil Co. is figuring on taking gas to the Gallatin Valley, Mont., and the Montana-Dakota Power Co. may extend its lines to Bismarck, N. D. The North Central Gas Co. plans to run a line from Wyoming to western Nebraska, and the Western Public Service Corpn. may extend service from Ogden, Utah, to Pocatello, Idaho. Another line in prospect is from southwestern Kansas to Colorado Springs and Florence, Colo. While the trade is awaiting developments of this kind, shipments of skelp to pipe mills remain fairly steady. Prices in the Chicago plate market have steadied at 1.70c. to 1.80c. a lb.

HOT-ROLLED STRIP

Demand for this commodity remains fairly steady, and output stands at 40 per cent of capacity, or possibly a shade higher. Quotations are lower, bringing this market in line with Eastern markets. Strips 6 in. and narrower are priced at 1.70c. to 1.75c. a lb. and strips wider than 6 in. are quoted at 1.60c. to 1.65c.

COLD-ROLLED STRIP

Output of cold-rolled strip has not been able to climb above 35 per cent of capacity. The outlook for the immediate future is unchanged.

STRUCTURAL MATERIAL

Awards in this market are unimpressive at about 1000 tons, but fresh inquiries total more than 35,000 tons. Highway bridge work again figures prominently in current business, and, though railroad orders are confined to a few spans of about 50-ft. size, new inquiries from this source total 5000 tons. The Santa Fe will build an overhead crossing near Chicago, which will take 4100 tons. Foremost among new projects is the Marshall Field Estate Building, requiring about 16,000 tons. It appears that this inquiry has not been broad-

cast, but nevertheless it is active. Plans call for erection in units over about two years, but it is understood that efforts are being made to place the entire tonnage at this time. The Thirty-fifth Street viaduct at Milwaukee is about ready to come out for new bids, the steel requirements being 7000 tons. It is reported that bids will soon be taken on the foundation work for the Chicago Post Office. This structure as a whole will require close to 45,000 tons of steel. A round tonnage will be used for caisson rings and miscellaneous requirements up to the ground floor. The South Park and Lincoln Park commissioners are reported to have placed the steel, about 7000 tons, for the Outer Bridge. Structural shapes are commonly quoted at 1.70c. to 1.80c. a lb., Chicago.

BARS

General specifications for bar mill products are in larger volume and are holding a more prominent place in current business than at any time this year. In fact, bar releases in the past six or seven days are in large measure responsible for an upward turn in specifications for finished steel products as a whole. Farm implement manufacturers, as large users of steel, are temporarily out of the picture, but road machinery builders are holding to well rounded schedules. If current specifications are a true indicator, automobile manufacturers will bring May production above the April figure. The iron bar market remains very quiet. Both mild steel bars and iron bars are quotable at 1.70c. to 1.80c. a lb., Chicago. Specifications for rail steel bars in April were the largest for any month so far this year and releases still are in good volume. However, new buying is dull.

RAILS AND TRACK SUPPLIES

Of special interest in this market is a purchase of 15,000 tons of standard-section rails by the Missouri Pacific. Of this order, 4000 tons each went to Illinois Steel Co. and Inland Steel Co., the remainder, 7000 tons, having been divided between the Colorado mill and the Tennessee company. A few scattered orders for track accessories total 1500 tons. Specifications for rails this week total 6000 tons. Local rail mills are producing at about 45 per cent of capacity.

CAST IRON PIPE

This market has turned quieter, the bulk of transactions being in small miscellaneous lots, many of which are going into small water filter and unimportant sewage treating undertakings. Flint, Mich., has ordered 100 tons of cast iron pipe, and Audubon, Iowa, has closed for 11,000 ft. of 10-in. pipe with the American Cast Iron Pipe Co. It is reported that Appleton, Wis., has deferred action on its inquiry for 16,000 ft. of 6 to 12-in. Class C pipe, on which James B. Clow & Sons were low bidders. Valparaiso, Ind., is in the market for 300 tons of 10 to 16-in. pipe.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.90c.
Reinforcing bars, billet steel	1.70c. to 2.00c.
Rail steel reinforcement	1.50c. to 1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.35c.
Flats and squares	3.85c.
Bands, $\frac{1}{4}$ in. (in Nos. 10 and 12 gages)	3.10c.
Hoops (No. 14 gage and lighter)	3.65c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.35c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes $\frac{1}{2}$ in. and larger)	3.45c.
Track bolts	4.30c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach and lag screws	60 and 10
Hot-pressed nuts, sq., tap. or blank,	60 and 10
Hot-pressed nuts, hex., tap. or blank,	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over $43 to $44; 4-in., $46 to $47; Class A and gas pipe, $3 extra.

SHEETS

Demand for sheets remains below seasonal expectations. Hot mill output for the district is not above the range of 45 to 50 per cent of capacity. Distribution by jobbers is erratic, but manufacturers of troughs and conductor pipe are making use of fairly good tonnages. No. 10 blue annealed sheets are quotable at 1.95c. and galvanized sheets at 2.90c. a lb., Chicago district mill.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.40c. to 2.50c.; No. 24 galv., 2.95c. to 3.05c.; No. 10 blue ann'l'd, 2.00c. to 2.10c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

BOLTS, NUTS AND RIVETS

There is little change in this market except for the fact that scattered inquiries and spot buying are turning upward.

WIRE PRODUCTS

Output of these commodities remains at 45 per cent of capacity, though the general character of business and the directions from which it comes are constantly changing. Demand from jobbers continues to expand in the Northwest and distribution remains in fair volume in the South. New sales and specifications out of the Detroit area are said to be the best in many months. The general manufacturing trade remains spotty, with little change in the aggregate tonnage taken by it.

REINFORCING BARS

Keen competition is resulting in greater variations in prices. Rail steel bars are commonly priced at 1.50c. a lb., but some sales have been made below this figure. Billet bars have sold as low as 1.70c. a lb., warehouse. The price structure is so variable that not even the size of tonnage involved has much bearing. Highway work is swinging into full stride.

COKE

By-product foundry coke has been reduced 50c. a ton to $7.50 a ton, local ovens, or $8.25 a ton, delivered Chicago. New buying is quiet. Shipments vary little from week to week.

OLD MATERIAL

Heavy melting steel is off 25c. a ton, not on actual sales to users, but because of the declared willingness of sellers to accept $9.50 a gross ton, delivered. The whole situation has become so demoralized that the Chicago & North Western has withdrawn a list. Low prices and freedom of shipments have prompted two steel producers to blow out two blast furnaces, with the idea in view of using more scrap in open-hearths. Dealers are finding heavy melting steel supplies freely available at the equivalent of $9 a gross ton, delivered consumers' yards.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$9.00 to	$9.50
Shoveling steel	9.00 to	9.50
Frogs, switches and guards, cut apart, and misc. rails	9.00 to	9.50
Factory hyd. comp. sheets	7.25 to	7.75
Drop forge flashings	6.00 to	6.50
No. 1 busheling	7.00 to	7.50
Forg'd cast and r'l'd steel carwheels	11.50 to	12.00
Railroad tires, charg. box size	11.75 to	12.25
Railroad leaf springs cut apart	11.75 to	12.25
Axle turnings	7.50 to	8.00
Acid Open-Hearth Grades:		
Steel couplers and knuckles	9.75 to	10.25
Coil springs	11.50 to	12.00
Electric Furnace Grades:		
Axle turnings	7.50 to	8.00
Low phos. punchings	10.75 to	11.25
Low phos. plates, 12 in. and under	10.50 to	11.00
Blast Furnace Grades:		
Cast iron borings	3.75 to	4.00
Short shoveling turnings	3.50 to	4.00
Machine shop turnings	3.50 to	4.00
Rolling Mill Grades:		
Rerolling rails	11.25 to	11.75
Cupola Grades:		
Steel rails, less than 3 ft.	10.75 to	11.25
Steel rails, less than 2 ft.	11.75 to	12.25
Angle bars, steel	10.00 to	10.50
Cast iron carwheels	9.50 to	10.00
Malleable Grades:		
Railroad	10.25 to	10.75
Agricultural	9.75 to	10.00
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	19.00 to	21.00
*Relaying rails, 65 lb. and heavier	22.00 to	27.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	9.50 to	10.00
Iron arch bars, and transoms	10.50 to	11.00
Iron car axles	17.50 to	18.50
Steel car axles	11.50 to	12.00
No. 1 railroad wrought	7.50 to	8.00
No. 2 railroad wrought	8.00 to	8.50
No. 1 busheling	6.00 to	6.50
No. 2 busheling	4.00 to	4.50
Locomotive tires, smooth	11.50 to	12.50
Pipes and flues	5.50 to	6.00
Cupola Grades:		
No. 1 machinery cast	9.00 to	9.50
No. 1 railroad cast	8.00 to	8.50
No. 1 agricultural cast	7.00 to	7.50
Stove plate	6.25 to	6.75
Grate bars	6.25 to	6.75
Brake shoes	6.50 to	7.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

CLEVELAND — Steel Orders and Operations Show No Further Decline

CLEVELAND, May 5.—The steel market showed virtually no change the past week. Business in the first few days of May was somewhat below that of the corresponding period of April. Cleveland steel plants are able to maintain their recent 56 per cent operations. For the fourth successive week, 19 of 34 open-hearth furnaces are in use. Little change is reported in finishing mill operations in this district.

Independent mills making common black sheets are operating this week at 48 per cent of capacity, jobbing mills at 38 per cent and full finished sheet and hot-rolled strip mills at 47 per cent of capacity, these operations showing virtually no change as compared with the two preceding weeks.

Although some good releases for sheets and hot-rolled strip came from the motor car industry during the week, demand from that source is spotty. The local Fisher body plant is still operating at virtually 100 per cent of capacity on Chevrolet bodies, and releases from that source are holding up to recent volume. Some of the Michigan motor car plants are placing steel for early needs without covering for expected requirements for the entire month.

Demand for steel from manufacturing consumers in other fields shows no increase.

Important developments are lacking in the price situation. However, this has been clarified by the settling of bars to 1.65c., Cleveland, for outside shipment and of plates and shapes to 1.65c., Pittsburgh. The new sheet classification will not be generally applied until the third quarter.

IRON ORE

There is very little activity in the ore market, although a few small-lot sales are pending. Water shipments started during the week. There was a movement of 175,921 tons during April, compared with 107,559 tons during the same month last year.

PIG IRON

Sales and inquiries increased somewhat the past week, the gain in activity being largely in northern and central Ohio. A Dayton consumer bought 1000 tons of foundry iron for the second quarter, and several other lots of 500 tons or less were placed. The inquiry from the Westinghouse Electric & Mfg. Co. for iron for its Cleveland and Trafford City plants is still pending. Locally, the market is inactive. Releases for May shipment so far received by furnaces indicate a slightly better movement this month than in April. Prices are steady, and there seems to be little disposition among producers to make concessions by absorbing freight rates. As a result, business usually goes to the furnace having the lowest rate. Foundry and malleable iron are quoted at $16 to $17, Lake furnace, for Ohio and Indiana, $17 for Cleveland and $17 to $17.50 for Michigan delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$17.00
S'th'n fdy., sil. 1.75 to 2.25	17.01
Malleable	17.50
Ohio silvery, 8 per cent	25.00
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

STRIP STEEL

While some good specifications for hot-rolled strip came out during the week, there was little change in the aggregate demand. The market has become fairly well stabilized at 1.50c., Pittsburgh, for wide strip and 1.60c. for narrow for good lots and $1 a ton higher for small orders. Cold-rolled strip is being quoted at 2.25c., Cleveland. However, demand is limited to small lots that do not furnish a test of the price, on which a concession to 2.15c. has been reported in the Pittsburgh territory.

SHEETS

Specifications from the motor car industry are holding up to recent volume and a fair amount of business is still coming from refrigerator manufacturers. Orders from jobbers for galvanized sheets have improved. Demand from other sources is spotty. While several of the mills have announced that they expect to accept the new classification, they are going slow in formally adopting the changes. These will not become generally effective before the third quarter, as mills are committed with many consumers for the present quarter at prices prevailing under the old classification. While some mills have not gone below 2.25c. on black sheets, the 2.15c. price has become more general and concessions to about the same extent have been made in some cases by the quotation of a 2.25c. mill base. Quotations above 2.80c. on galvanized sheets have about disappeared.

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.85c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.40c.
Cold-fin. flats and sq	3.90c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.10c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.60c.
Galvanized sheets (No. 24)	4.00c.
Blue ann'l'd sheets (No. 10)	3.10c.
No. 9 ann'l'd wire, per 100 lb	$2.35
No. 9 galv. wire, per 100 lb	2.80
Com. wire nails, base per keg	2.25

*Net base, including boxing and cutting to length.

BARS, PLATES AND SHAPES

Demand for merchant steel bars is hardly holding up to recent volume. Orders are scattering and for small lots. However, alloy steel bars took a little spurt the past week. While there is some activity in reinforcing bars, it is less than usual at this time of year, and keen competition is bringing out price irregularities. Plates are moving fairly well in small lots. Activity in the building field is light, and the demand for structural shapes dull. Steel bars have settled to a flat 1.65c. Cleveland price for outside shipment. For local delivery, 1.70c. is being maintained. Plates and shapes are firm at 1.65c., Pittsburgh, efforts to get 1.70c. for small lots having virtually disappeared.

WIRE PRODUCTS

Following the spring buying, nail orders from retailers are lighter than recently. Jobbers are still placing orders against $1.90 per keg contracts. Manufacturers' wire is dull. While this product is nominally quoted at 2.30c., Cleveland, the 2.20c. price evidently has not disappeared.

OLD MATERIAL

A Valley mill during the week purchased a small tonnage of No. 1 heavy melting steel at $12 and short shoveling turnings at $7. Machine shop turnings are bringing $4, Cleveland, for outside shipment. Dealers are paying $10.50 for No. 2 heavy melting steel and $11 for compressed sheet steel for Valley shipment.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$9.75 to $10.25
No. 2 heavy melting steel	9.50 to 9.75
Compressed sheet steel	8.50 to 9.00
Light bundled sheet stampings	7.00 to 7.50
Drop forge flashings	7.50 to 8.00
Machine shop turnings	4.00 to 4.50
Short shoveling turnings	6.75 to 7.00
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	10.00 to 10.50
No. 1 busheling	8.00 to 8.50
Pipes and flues	5.50 to 6.00
Steel axle turnings	8.00 to 8.50
Acid Open-Hearth Grades:	
Low phos., billet bloom and slab crops	14.00 to 14.50
Blast Furnace Grades:	
Cast iron borings	6.25 to 6.75
Mixed borings and short turnings	6.25 to 6.75
No. 2 busheling	6.00 to 6.50
Cupola Grades:	
No. 1 cast	12.00 to 12.50
Railroad grate bars	6.00 to 6.50
Stove plate	6.00 to 6.50
Rails under 3 ft	15.00 to 15.50
Miscellaneous:	
Rails for rolling	13.00 to 13.50
Railroad malleable	12.00 to 12.50

NEW YORK

Steel Demands Irregular—New York Merchant Blast Furnace Blown In

NEW YORK, May 5.—In the face of an exceedingly dull pig iron market Witherbee, Sherman & Co. blew in a furnace at Port Henry, N. Y., on May 1. This is perhaps the most encouraging development of recent weeks, because it suggests that the New York financial interests controlling the Port Henry property see better demand in the offing.

Current shipments are light, although showing improvement in spots, and sizable inquiries are notable by their absence. Sales, at 4000 to 4500 tons, compare with less than 3000 tons in the previous week. Individual transactions are too small to bring out any new price developments.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$19.91 to $20.41
*Buff. No. 2, del'd east. N. J.	18.28 to 18.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	17.39 to 17.89
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	17.89 to 18.39

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

WAREHOUSE BUSINESS

Buying continues in fair volume, although demand for structural material is declining. Black and galvanized sheets are still moderately active and prices are fairly well maintained, with only occasional concessions of $1 to $2 a ton on the larger orders.

FINISHED STEEL

Irregularity marks the course of steel business in this district. It is a common experience of some companies to find sales low one week and fairly good the next. On the whole, the volume is no greater than during the latter half of April, when a noticeable decline had set in. Some sales offices report business to be the quietest of any time during the past year, with the possible exception of the last month or two of 1930.

In view of the small orders being placed, many running to a few tons each, the price situation is not undergoing a very severe test. Sheets are the weakest products. Black sheets have been sold as low as 2.15c., Pittsburgh, with 2.25c. obtainable only on small lots. Galvanized sheets have settled to 2.80c. Steel bars seem to be holding fairly well at 1.65c., Pittsburgh, though so many buyers are covered on contract that new business is at a minimum. Plates, however, do not present so strong a front. While a good many small plate orders are being taken at 1.75c. and 1.80c., Coatesville, Pa., sizable tonnages could be placed at 1.70c. with some mills.

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue ann'l'd sheets (No. 10)	3.00c. to 3.25c.
Black sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10

	Per 100 Ft.
Boiler Tubes:	
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

CAST IRON PIPE

Pressure pipe buying is generally limited to small lots for completion of current contracts. Quotations are unchanged on recent business at $31 to $32 a net ton, f.o.b. Northern foundry. About 2000 tons of water pipe for Cebu, P. I., has been placed with an American maker, and Spring Lake, N. J., has closed on 1000 tons of pipe with an unnamed producer.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $34.90 to $35.90; 4-in. and 5-in., $37.90 to $38.90; 3-in., $44.90 to $45.90. Class A and gas pipe, $3 extra.

REINFORCING BARS

Prices are still irregular, with 1.65c. a lb., Pittsburgh, or 1.98c., New York, quoted on small lots, and concessions of $1 and $2 a ton granted on more desirable contracts. New reinforced concrete projects are small, but a fair tonnage of work is in the market. In addition to a number of contracts requiring 50 to 75 tons of bars each, an underpass at McLean Avenue, Yonkers, N. Y., requiring 100 tons, was placed in the past week.

OLD MATERIAL

Except for purchases of No. 1 heavy melting steel for shipment to eastern Pennsylvania and by barge to Buffalo consumers, the market is quiet on all grades of scrap. At a recent opening of bids on scrap offered by the Baltimore & Ohio Railroad, the high bid on No. 1 steel was $11, delivered in the Pittsburgh district, and a high bid of $10.25 a ton was received on a tonnage of old rails. Foundry grade stove plate is being bought at $7 a ton, delivered to a West Mahwah, N. J., consumer, which is about $4.75 a ton, New York, equivalent to the price offered for stove plate for shipment to eastern Pennsylvania steel mills.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$6.50 to	$7.25
Heavy melting steel (yard)	4.25 to	4.75
No. 1 hvy. breakable cast	6.75 to	7.50
Stove plate (steel works)		4.75
Locomotive grate bars		4.75
Machine shop turnings		3.00
Short shoveling turnings		3.00
Cast borings (blast fur. or steel works)		3.00
Mixed borings and turnings	2.50 to	3.00
Steel car axles	12.50 to	13.00
Iron car axles	16.50 to	17.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)		6.75
Forge fire	5.50 to	6.00
No. 1 railroad wrought		8.75
No. 1 yard wrought, long		7.75
Rails for rolling	8.25 to	8.75
Stove plate (foundry)	4.75 to	5.25
Malleable cast (railroad)	8.50 to	9.00
Cast borings (chemical)	8.00 to	8.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$12.50
No. 1 hvy. cast (columns, bldg. materials, etc.); cupola size	10.50
No. 2 cast (radiators, cast boilers, etc.)	10.00

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Bituminous Coal Stocks for 29 Days

Stocks of bituminous coal in industrial hands in the United States are estimated by the National Association of Purchasing Agents to be adequate for 29 days of operation at current rates. By-product coke plants have enough for 26 days; electric utilities, for 45 days; coal gas plants, for 76 days; railroads, for 23 days; steel mills, for 26 days and other industries for 29 days. Industrial stocks of anthracite and bituminous coal in the United States and Canada on April 1 are placed at 29,990,000 net tons. This shows a drop of 5 per cent from the March 1 total and is the lowest figure in considerably more than a year.

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New South Chicago Plate Mill Starts Operations

CHICAGO, May 4.—The new 96-in. plate mill of the Illinois Steel Co. at South Chicago started operations on April 29, making a very satisfactory initial performance.

PHILADELPHIA

Steel Operations Lower—Oil Company Buys 200 Miles of Pipe

PHILADELPHIA, May 5.—Operating rates of eastern Pennsylvania steel mills averaged slightly under 40 per cent of capacity in the past week, except for the leading independent, which maintained a higher schedule. Steel consumers have not reduced operations to any extent, but are buying small lots of material for immediate needs.

The only sizable projects requiring substantial steel tonnages are long-distance pipe lines. The Atlantic Refining Co. has awarded a contract for a 200-mile line of 6 and 8-in. steel pipe to run from Point Breeze, Pa., to the New York State border, and the Sun Oil Co. is preparing to revive an inquiry for a pipe line in Ohio. Oil companies are also inquiring for some small tonnages of plates for new tanks and tank repair work and special grades for still bottoms and fire boxes.

PIG IRON

Buying is mostly of small lots of foundry iron, usually one or two carloads. With stocks virtually non-existent at most consumers' plants, immediate shipment is specified. On such business, $17 a ton, furnace, usually applies, but on medium-sized tonnages $16.50 a ton, furnace, is increasingly common. The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., is inquiring for 550 tons of No. 1X iron with medium phosphorus and 100 tons of No. 1X with slightly higher phosphorus content. While the smaller lot is expected to go to a Birmingham maker, it is said that the larger tonnage with lower phosphorus content may be placed with an eastern Pennsylvania furnace, which could ship on a low barge rate from Philadelphia. Basic iron is inactive, with most consumers covered.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$17.26 to $17.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	17.76 to 18.26
East. Pa. No. 1X	18.26 to 18.76
Basic (del'd east. Pa.)	17.00 to 17.25
Malleable	19.00 to 20.00
Stand. low phos. (f.o.b. east. Pa. furnace)	23.00 to 24.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2 plain, 1.75 to 2.25 sil	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

STEEL BARS

On new business 1.65c. to 1.70c. a lb., Pittsburgh, or 1.94c. to 1.99c., Philadelphia, is quoted on lots ranging up to a carload. On more substantial business, concessions of $1 a ton have been made to the larger users, a result of competition for bar orders by eastern Pennsylvania rerolling mills. Reinforcing bar prices continue to be irregular, with 1.65c., Pittsburgh, or 1.94c., Philadelphia, applying on small lots and concessions of $1 and $2 a ton on larger lots. Rail steel bars are quoted at 1.20c. to 1.35c. a lb., Pittsburgh, or 1.49c. to 1.64c., Philadelphia. The only important reinforcing bar contract placed recently is 1200 tons for the Broad Street subway, Philadelphia

PLATES

Buying is restricted to small lots, except for some orders from oil companies. Shipbuilders have been bidding for some small contracts recently. Prices are unchanged at 1.75c. a lb., Coatesville, Pa., or 1.85½c., Philadelphia, for new business, with occasional concessions of $1 a ton on large orders.

SHAPES

On most new business the quotation is 1.75c. a lb., f.o.b. nearest mill to consumer, or 1.81c., Philadelphia, but on sizable contracts concessions of $1 a ton occasionally appear. A portion of 13,000 tons of shapes for Government aircraft hangars awarded to a fabricator in this district is being placed with eastern Pennsylvania mills.

SHEETS

Eastern Pennsylvania mills have not yet adopted the new classification for hot and cold-rolled sheets, but are expected to do so in the next few days. Meanwhile, quotations continue at 2c. a lb., Pittsburgh, or 2.29c., Philadelphia, for No. 13 gage blue annealed sheets, and 1.85c., Pittsburgh, or 2.14c., Philadelphia, for No. 10 gage blue annealed plates. Black sheets are quoted at 2.25c., Pittsburgh, or 2.54c., Philadelphia, with concessions on the larger business down to 2.15c., Pittsburgh, or 2.44c., Philadelphia, and galvanized sheets range from 2.80c. to 2.85c., Pittsburgh, or 3.09c. to 3.14c., Philadelphia.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforc. steel bars, sq., twisted and deform.	2.50c. to 2.60c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.15c.
Steel bands, No. 12 to ⅛-in. inclu.	2.90c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.50c.
†Galvanized sheets (No. 24)	3.95c.
Light plates, blue annealed (No. 10)	3.05c.
Blue ann'l'd sheets (No. 13)	3.20c.
Diam. pat. floor plates, ¼-in.	5.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 40 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.20c. base.

IMPORTS

In the week ended May 2, 4800 tons of iron ore arrived at this port from Algeria and 2011 tons of manganese ore was received from the Gold Coast in Africa. Pig iron arrivals consisted of 1591 tons from British India, while 314 tons of structural shapes arrived from Germany and two tons of scrap iron from Canada.

OLD MATERIAL

All grades of scrap are inactive, with buying limited to small lots, but, on the basis of recent offers to sell, certain grades show a further decline in price. Small lots of heavy breakable cast have been bought by eastern Pennsylvania consumers at $11 a ton and forge fire has been sold at $9.50 and $10 a ton. Other grades are quiet.

Prices per gross ton delivered consumers' yards, Philadelphia district

No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting steel	8.00 to 8.50
Heavy melting steel (yard)	7.50 to 8.00
No. 1 railroad wrought	11.00 to 11.50
Bundled sheets (for steel works)	8.50 to 9.00
Hydraulic compressed, new	9.00 to 9.50
Hydraulic compressed, old	7.50 to 8.00
Machine shop turnings (for steel works)	6.50 to 7.00
Heavy axle turnings (or equiv.)	9.50 to 10.00
Cast borings (for steel works and roll. mill)	7.50
Heavy breakable cast (for steel works)	11.00 to 11.50
Railroad grate bars	8.50 to 9.00
Stove plate (for steel works)	8.50 to 9.00
No. 1 low phos., hvy., (0.04% and under)	15.00 to 15.50
Couplers and knuckles	13.75 to 14.25
Rolled steel wheels	13.75 to 14.25
No. 1 blast f'nace scrap	6.00
Wrot. iron and soft steel pipes and tubes (new specific.)	11.50
Shafting	16.50 to 17.00
Steel axles	16.50 to 17.00
No. 1 forge fire	9.50 to 10.00
Cast iron carwheels	12.50 to 13.00
No. 1 cast	12.00 to 12.50
Cast borings (for chem. plant)	13.50 to 14.00
Steel rails for rolling	12.00 to 13.00

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Decrease in Cleveland Employment for April

A slight decrease in operations in metal-working plants in Cleveland during April as compared with March is shown by the monthly report of the Cleveland Chamber of Commerce. Reports from 42 plants covering various metal-working industries showed 15,904 employees for April as compared with 16,194 in March, a decline of 1.9 per cent. Nonferrous industries classed in a separate group showed a slight gain.

BOSTON

Pig Iron Market in Doldrums—Cast Iron Pipe Prices Weak

BOSTON, May 5.—The pig iron market is in the doldrums, sales the past week totaling only 500 tons. There is little indication of business improvement in the near future. The New England melt is about 20 to 25 per cent of capacity. Foundries are holding up pig iron shipments and are increasing the percentage of scrap used in melts. A Massachusetts melter, who was expected to be in the market for 1000 tons or more at this time, has made no move as yet. Buffalo iron on a rail and water rate is now offered.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.91 to $20.91
*Buffalo, sil. 2.25 to 2.75	19.91 to 20.91
†Buffalo, sil. 1.75 to 2.25	19.28 to 20.28
†Buffalo, sil. 2.25 to 2.75	19.28 to 20.28
*Ala., sil. 1.75 to 2.25	20.11 to 20.61
*Ala., sil. 2.25 to 2.75	20.61 to 21.11
†Ala., sil. 1.75 to 2.25	16.75
†Ala., sil. 2.25 to 2.75	17.25

Freight rates: $4.91 all rail from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

CAST IRON PIPE

R. D. Wood & Co. have sold 10,000 ft. of 12-in. pipe to Gorham, N. H., and 110 tons to Littleton, Mass. The United States Pipe & Foundry Co. has sold Peabody, Mass., a year's pipe requirements and 155 tons of 6 and 8-in. to Mansfield, Mass. The Donaldson Iron Co. has sold 110 tons of 6 and 8-in. pipe to Winchendon, Mass., while the Warren Foundry & Pipe Co. sold 89 tons of 10-in. Class 200 cement-lined and 50 tons of smaller pipe to Weston, Mass. Somerville, Mass., is in the market for 115 tons of 4 to 14-in. pipe. Prices are unsettled. While $34 a ton is generally quoted on 6-in. and larger sizes of Class B pipe, f.o.b. foundry, sales were made the past week at less.

REINFORCING BARS

Awards of billet steel bars the past week were just under 500 tons and included 260 tons for a Lynn, Mass., telephone exchange. All bids for a Charlestown district school, involving 250 tons of bars, were rejected. It is expected that 500 tons for Massachusetts road work will be awarded this week. Billet bars from stock are: One to 5-ton lots, 3c. a lb., base; 6 to 99-ton lots, 2.40c.; 100-ton lots and larger, 2.30c. Rail steel bars are 2.26½c. a lb., delivered Boston rate points.

OLD MATERIAL

Orders are confined to an occasional car of No. 1 heavy melting steel, T rails and bundled skeleton for Worcester, Mass., consumption, and steel turnings, steel mill borings and mixed borings and turnings for Pennsylvania consumption. Business is duller than it has been at any time during the current depression. The best bid received from a Pennsylvania steel mill for shafting is $14 a ton, delivered, equivalent to $9.60 a ton, on cars shipping point. No. 2 cast is generally $5 a ton, on cars shipping point, and breakable cast generally $6.10.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.00 to $6.25
Scrap T rails	6.00 to 6.25
Scrap girder rails	5.00 to 5.25
No. 1 railroad wrought	7.00 to 7.50
Machine shop turnings	2.00 to 2.25
Cast iron borings (steel works and rolling mill)	2.00 to 2.25
Bundled skeleton, long	5.00 to 5.25
Forge flashings	5.00 to 5.25
Blast furnace borings and turnings	1.75 to 2.00
Forge scrap	5.00 to 5.25
Shafting	10.00 to 10.50
Steel car axles	11.00 to 12.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	5.00 to 5.50
Rails for rolling	7.50 to 8.00
Cast iron borings, chemical	9.00 to 9.60
No. 2 cast	5.00 to 5.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$9.00 to $10.00
No. 1 machinery cast	9.00 to 10.00
Stove plate	7.00 to 7.25
Railroad malleable	13.00 to 13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.36½c.
Structural shapes—	
Angles and beams	3.36½c.
Tees	3.36½c.
Zees	3.36½c.
Soft steel bars, small shapes	3.26½c.
Reinforcing bars	3.11½c. to 3.26½c.
Iron bars—	
Refined	3.26½c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.80c.

	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts	60 and 5
Cold-punched nuts	60 and 5
Stove bolts	70 and 10

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BIRMINGHAM

Steel Trend Slightly Downward—Pig Iron Still Dull

BIRMINGHAM, May 5.—The pig iron market is moving along slowly. Current tonnage is mostly in small lots. The general tone of the market has changed but little during the past month or so. Shipments have been off during the past two weeks, and the April total of the merchant producers of this district was below that for March. Quotations remain at $12 to $13. May 1, Gulf States Steel Co. changed its stack from basic to foundry iron. Thirteen furnaces were in operation throughout April.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$12.00 to $13.00
No. 1 fdy., 2.25 to 2.75 sil.	12.50 to 13.50
Basic	12.00 to 13.00

CAST IRON PIPE

The spring season continues to be backward, and local plants still lack the tonnage that should flow in at this time of the year. Small orders have been fairly numerous, and these have sustained plant operations at a rate of about 65 per cent, but do not permit an increase or assure operations very far in advance. Quotations continue on a basis of $35 to $36.

FINISHED STEEL

New tonnage last week was not up to the level that has been maintained for some time past. Structural steel fabricators report very little improvement, but reinforcing bar fabricators are having a better run of small orders. Virginia Bridge & Iron Co. secured 540 tons of structural steel on Friday from the Louisville & Nashville Railroad for five bridges. Nashville Bridge Co. is apparently low bidder for construction of a dredge for delivery to United States Engineers at Vicksburg. The Tennessee company is operating 11 open hearths, as compared with 13 two weeks ago. Gulf States Steel continues with three.

COKE

Buying is sporadic. Deliveries are at a minimum. Quotations remain at $5.

OLD MATERIAL

Buying is light, but movement on contracts for steel rail, heavy melting steel and No. 1 cast was better last week. Other grades are quiet. Prices are unchanged.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	10.00
Short shoveling turnings	7.50
Cast iron borings	(No market)
Stove plate	7.50
Steel axles	15.00 to 16.00
Iron axles	18.00
No. 1 railroad wrought	8.00
Rails for rolling	11.50 to 12.00
No. 1 cast	10.00
Tramcar wheels	11.00 to 11.25
Cast iron borings, chem.	13.50
Cast iron carwheels	11.00

ST. LOUIS

Missouri Pacific Places 15,000-Ton Rail Order with Four Makers

ST. LOUIS, May 5.—April shipments of pig iron to melters in this district are reported to have been smaller than for March. However, there is a feeling that specifications for May shipment will show a considerable improvement. During the last week little new business was placed. Gray iron foundries are said to be operating an average of only three days a week. Malleable plants catering to agricultural implement manufacturers near by report business dull. Trade with the stove foundries is quiet. Prices of pig iron are unchanged and apparently firm, although there has not been sufficient buying lately to test the market.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	15.42
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

FINISHED STEEL

The most favorable news in weeks was the placing of an order for 15,000 tons of rails by the Missouri Pacific Railway and the issuance of inquiries for splice bars. The rail order was allocated among the Illinois Steel Co., Colorado Fuel & Iron Co., Tennessee Coal, Iron & Railroad Co. and Inland Steel Co. on virtually an equal basis. Business in plates, shapes and bars is quiet. Warehouse trade for April was slightly less than for March in volume, although the number of orders was greater. The first few days in May indicated a pick-up in business.

OLD MATERIAL

Melting steel of all grades declined 25c. a ton during another week of dullness in the old material market. There was very little buying by mills in the district, although dealers are willing to lay down scrap in their yards at present prices. Machine shop turnings, No. 1 busheling and No. 2 railroad wrought are 25c. lower, and railroad springs, heavy turnings, steel car axles and steel angle bars are 50c. lower. Cast iron carwheels and agricultural malleable are $1 less, and railroad malleable is $1.25 off.

Pennsylvania Railroad heads the railroad lists, with 57,680 net tons, although this system has consistently withdrawn lists because of low prices during the last three months. Other railroad lists follow: Baltimore & Ohio, 9765 tons; Chicago & North Western, 2300 tons; Missouri-Kansas-Texas, 950 tons; Milwaukee Road, 162 carloads; Missouri Pacific, 117 carloads; St. Louis-San Francisco, 23 carloads; Peoria & Eastern, three carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$8.25 to $8.75
No. 1 heavy melting or shoveling steel	8.00 to 8.50
No. 2 heavy melting or shoveling steel	7.50 to 8.00
No. 1 locomotive tires	10.00 to 10.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	9.00 to 9.50
Railroad springs	10.00 to 10.50
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	5.75 to 6.25
Cast iron borings and shoveling turnings	5.50 to 6.00
Iron rails	8.00 to 8.50
Rails for rolling	10.00 to 10.50
Machine shop turnings	2.75 to 3.25
Heavy turnings	6.00 to 6.50
Steel car axles	12.00 to 12.50
Iron car axles	17.50 to 18.00
Wrot. iron bars and trans.	9.00 to 9.50
No. 1 railroad wrought	6.00 to 6.50
Steel rails, less than 3 ft.	11.00 to 11.50
Steel angle bars	8.00 to 8.50
Cast iron carwheels	7.00 to 7.50
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	8.25 to 8.75
No. 1 railroad cast	8.50 to 9.00
Stove plate	7.00 to 7.50
Relay. rails, 60 lb. and under	16.00 to 16.50
Relay. rails, 70 lb. and over	20.00 to 21.00
Agricult. malleable	7.50 to 8.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shaftings, screw stock	3.60c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.10c.
Galv. corrug. sheets	4.65c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, ½-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60 and 10
Carriage bolts	60 and 10
Lag screws	60 and 10
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60 and 10
Less than 200 lb.	50 and 10
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60 and 10
Less than 200 lb.	50 and 10

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BUFFALO

Steel Operations Gain Slightly—Pig Iron and Scrap Laggard

BUFFALO, May 5.—Miscellaneous pig iron orders probably were less than 3000 tons the past week, all for immediate delivery. One concern, with plants in New York, Pennsylvania and Ohio, is inquiring for an indeterminate tonnage for delivery over the last half, but this iron is not expected to come to a Buffalo furnace. A 500-ton inquiry in the East, mentioned last week, is reported to have been placed with a Southern maker.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.50
No. 2X fdy., sil. 2.25 to 2.75	18.00
No. 1 fdy., sil. 2.75 to 3.25	19.00
Malleable, sil. up to 2.25	18.00
Basic	17.50
Lake Superior charcoal	27.28

FINISHED STEEL

Lackawanna plant of the Bethlehem Steel Co. continues to maintain its 66 per cent open-hearth operation, with 16 of 24 furnaces on. Republic Steel Corpn. is operating three and Wickwire Spencer is now at three, a gain of one. Seneca Iron & Steel Co. is operating at about 50 per cent. An award has been made of 300 to 400 tons of reinforcing bars for the new State prison at Attica, N. Y., and 450 tons of structural steel for the same job is pending. Considerable road mesh tonnage has been acquired by a local maker, and its operation has been stepped up.

OLD MATERIAL

An order for No. 2 steel has been placed at a price said to be between $9.25 and $9.50. The same buyer is reported to have placed an order for cast iron borings, but the price is not known. Little other activity is noted in the scrap market, which continues to weaken.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.15c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex.	3.15c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.60c.
Bands	3.50c.
Hoops	3.90c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.20

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$10.50 to $11.00
No. 2 heavy melting scrap	9.00 to 9.50
Scrap rails	11.00 to 11.50
Hydraul. comp. sheets	9.00 to 9.50
Hand bundled sheets	8.00 to 8.50
Drop forge flashings	9.00 to 9.50
No. 1 busheling	9.00 to 9.50
Hvy. steel axle turnings	8.50 to 9.50
Machine shop turnings	4.50 to 5.00
No. 1 railroad wrought	9.00 to 9.50
Acid Open-Hearth Grades:	
Knuckles and couplers	12.50 to 13.00
Coil and leaf springs	12.50 to 13.00
Rolled steel wheels	12.50 to 13.00
Low phos. billet and bloom ends	13.00 to 14.00
Electric Furnace Grades:	
Short shov. steel turnings	6.75 to 7.25
Blast Furnace Grades:	
Short mixed borings and turnings	6.00 to 6.50
Cast iron borings	6.00 to 6.50
No. 2 busheling	6.00
Rolling Mill Grades:	
Steel car axles	15.00 to 15.50
Iron axles	16.00 to 16.50
Cupola Grades:	
No. 1 machinery cast	10.50
Stove plate	8.50 to 9.00
Locomotive grate bars	7.50 to 8.00
Steel rails, 3 ft. and under	13.00 to 13.50
Cast iron carwheels	11.50 to 12.00
Malleable Grades:	
Industrial	11.00 to 12.00
Railroad	11.00 to 12.00
Agricultural	11.00 to 12.00
Special Grades:	
Chemical borings	9.00 to 9.50

CINCINNATI

Demand for Pig Iron Subsides—Sheet Steel Operations About 50 Per Cent

CINCINNATI, May 5.—Demand for pig iron here has subsided to the level of two weeks ago, sales in the past week having amounted only to 2000 tons. April was not as good a month as March. Local foundries are still operating at a very low rate. With summer approaching, little or no improvement can be expected. Buyers are taking only enough material to cover the small current orders that are received.

A south central Ohio consumer took 500 tons of Northern foundry iron. The remainder of last week's business was in carload lots. Two central Ohio consumers are in the market for 500 tons and 300 tons of Northern iron respectively, and an Indiana buyer has inquired for 200 to 300 tons of the same grade.

Prices per gross ton, deliv'd Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$14.69
Ala. fdy., sil. 2.25 to 2.75	15.19
Tenn. fdy., sil. 1.75 to 2.25	14.69
S'th'n Ohio silvery, 8 per cent	23.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

COKE

With the local pig iron market quiet and foundries restricting melts to a low level, the demand for foundry grades of coke is low. Shipments during April were just a trifle less than those of March. Prices are unchanged, with by-product foundry coke quoted at $9, delivered in Cincinnati.

FINISHED STEEL

Demand for sheets remains at little better than 50 per cent of capacity, with mills sustaining operations in keeping with their order books. Orders are still for rush shipment, but are coming from many sources. The fabricated steel market is quiet.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.35c.
Cold-fin. rounds and hex.	3.80c.
Squares	4.30c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.40c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

OLD MATERIAL

Scrap sales are small and infrequent. Dealers are not buying without reasonable assurance of being able to dispose of material received.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$8.75 to	$9.25
Scrap rails for melting	10.25 to	10.75
Loose sheet clippings	4.50 to	5.00
Bundled sheets	7.75 to	8.25
Cast iron borings	4.75 to	5.25
Machine shop turnings	5.00 to	5.50
No. 1 busheling	7.25 to	7.75
No. 2 busheling	4.25 to	4.75
Rails for rolling	11.50 to	12.00
No. 1 locomotive tires	9.50 to	10.00
No. 2 railroad wrought	8.75 to	9.25
Short rails	13.25 to	13.75
Cast iron carwheels	10.50 to	11.00
No. 1 machinery cast	12.50 to	13.00
No. 1 railroad cast	11.50 to	12.00
Burnt cast	6.00 to	6.50
Stove plate	6.00 to	6.50
Brake shoes	6.00 to	6.50
Agricultural malleable	11.00 to	11.50
Railroad malleable	12.00 to	12.50

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PACIFIC COAST

Los Angeles Buys 2800 Tons of Cast Iron Pipe

SAN FRANCISCO, May 2.—(*By Air Mail.*)—General business conditions on the Pacific Coast have shown little improvement during the past 30 days. From present indications no large movement of steel products is expected during the rest of the first half.

The outstanding award was 2800 tons of cast iron pipe for Los Angeles, while the largest pending project call's for 1200 tons of structural shapes and 4000 tons of reinforcing bars for the Sixth Street viaduct, Los Angeles, bids on which have just been opened.

Pig iron prices per gross ton at San Francisco:

*Utah basic	$22.00 to $24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	2.50c.
Soft steel bars	2.50c.
Black sheets (No. 24)	4.15c.
Blue ann'l'd sheets (No. 10)	3.05c.
Galv. sheets (No. 24)	4.65c.
Struc. rivets, ½-in. and larger	5.00c.
Com. wire nails, base per keg	$3.35
Cement c't'd nails, 100 lb. keg	3.35

BARS

Awards of reinforcing steel bars totaled close to 1000 tons and included 400 tons for a hotel at Yakima, Wash., booked by the Pacific Coast Steel Corpn., and 300 tons for the Times-Mirror Building in Los Angeles, secured by the Soule Steel Co. This latter project was reported in THE IRON AGE issue of Feb. 26 as going to an unnamed interest. A bridge over the San Dieguito River, San Diego County, Cal., requiring 305 tons, was placed with an unnamed interest. New inquiries of size are slow in coming forth. Bids will be opened May 20 on 220 tons for paving work in Sacramento County, Cal., and on 125 tons for four bridges in Tulare County, Cal., Los Angeles out-of-stock prices remain firm at 2.50c., base, on carload lots, while San Francisco district quotations are unchanged at 2.60c., base.

PLATES

Movement of plates this week was restricted to small lots. No award has yet been made on 880 tons for a pipe line for San Francisco. Interest is centered in the opening of bids on 35,000 tons for the Hetch Hetchy pipe line. Prices are not firm at 2c., c.i.f.

SHAPES

Demand for structural material has shown little improvement of late. Most of the inquiries are for bridges. The Minneapolis Moline Power Implement Co. secured 350 tons for a bridge in California and 250 tons for a bridge at Plummer, Idaho. The Pacific Car & Foundry Co. took 230 tons for a bridge in Snohomish County, Wash. Bids have been opened on 303 tons for a bridge over the Eel River, Cal., and on 300 tons for the Islais Creek bridge, San Francisco. No new inquiries of importance developed during the week. Shapes range from 2.05c. to 2.15c., c.i.f.

CAST IRON PIPE

Awards of cast iron pipe so far this year total 31,000 tons, or 8000 tons less than for the same period in 1930. Los Angeles placed 1320 tons of 6 and 2-in. Class B with the American Cast Iron Pipe Co., 999 tons of 6-in. Class B with the Pacific States Cast Iron Pipe Co., 410 tons of 12-in. Class B with the United States Pipe & Foundry Co. and 167 tons of 6-in. Class B with the National Cast Iron Pipe Co. The Arizona Concrete Co. secured 128 tons of 2 to 6-in. Class B pipe for Peoria, Ariz. Wenatchee, Wash., placed 130 tons of 10-in. Class 150 pipe with E. B. Link. No new inquiries of importance came up for figures.

SHEETS

Movement continues to involve small lots only. Stocks in consumers' warehouses appear ample to take care of immediate requirements. Prices remain unchanged. Blue annealed is quoted at 2.50c., base, c.i.f., black sheets at 3c. and galvanized sheets at 3.50c., base, c.i.f.

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McInnes Steel Co., Corry, Pa., manufacturer of tool steels, has appointed the following sales representatives: Pittsburgh—Commercial Sales Co., 3710 Liberty Avenue; Detroit—M. F. Muir, 9817 McQuade Avenue; Cincinnati—Superior Products Co., Thoms Building.

Canada

Pig Iron and Scrap Buying in Small Lots

TORONTO, May 5.—Pig iron sales for prompt shipment are holding up to the average of recent weeks, but bookings for future delivery are negligible. Prices are unchanged.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	20.50

OLD MATERIAL

While new business in this market is without feature, a fair demand exists. Local dealers report that orders for machinery cast are appearing regularly, but bookings run to small tonnage. Mills are still accepting small tonnages of special grades of steel scrap. Prices are unchanged.

Dealers' buying prices for old material:

Per Gross Ton	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	....	10.00
Stove plate	....	8.00
Standard carwheels	....	8.50
Malleable	....	8.00
Per Net Ton		
No. 1 mach'ry cast	11.00	....
Stove plate	9.00	....
Standard carwheels	10.00	....
Malleable scrap	9.00	....

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Ingot Production 39,595,268 Tons and Rolled Iron and Steel, 29,513,007 Tons, in 1930

STEEL ingots and castings made in the United States in 1930 are reported by the American Iron and Steel Institute at 40,699,483 gross tons, the smallest figure since 1924, and a drop of almost 25 per cent from the record-breaking 1929 total. Of the amount mentioned, 39,595,268 tons represents ingots and 1,104,215 tons castings. The ingot figure is the lowest since 1924 and the castings figure the lowest since 1922.

Rolled iron and steel amounted to 29,513,007 tons, the smallest total since 1924, and a drop of 28 per cent from 1930. Of this amount 29,196,954 tons represents steel and 316,053 tons is rolled iron products; the latter is, the smallest total in perhaps 50 years.

Particulars of the ingots and castings are shown below, while the rolled iron and steel output appears on a separate page.

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES

Years	Open-Hearth Basic	Open-Hearth Acid	Open-Hearth Total	Bessemer	Crucible	Electric	Total, Gross Tons
1922	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	35,602,926
1923	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,872	44,943,696
1924	30,719,523	857,827	31,577,350	5,899,590	22,473	432,526	37,931,939
1925	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	45,393,524
1926	39,653,315	1,038,664	40,691,979	6,934,568	15,493	651,723	48,293,763
1927	37,144,268	924,067	38,068,335	6,191,727	9,036	666,087	44,935,185
1928	43,200,483	913,473	44,113,956	6,620,195	7,769	802,260	51,544,180
1929	47,232,419	1,120,469	48,352,888	7,122,509	6,645	951,431	56,433,473
1930	34,268,316	780,856	35,049,172	5,035,459	2,253	612,599	40,699,483

PRODUCTION OF STEEL INGOTS

1922	27,961,190	517,045	28,478,235	5,871,565	27,561	191,057	34,568,418
1923	34,093,711	653,337	34,747,048	8,416,576	42,127	279,914	43,485,665
1924	30,263,005	454,926	30,717,931	5,846,153	21,096	225,977	36,811,157
1925	36,632,060	484,843	37,116,903	6,670,128	17,729	335,978	44,140,738
1926	39,172,688	533,285	39,705,973	6,891,502	13,452	325,278	46,936,205
1927	36,750,387	493,653	37,244,040	6,153,703	7,696	371,278	43,776,717
1928	42,818,557	454,883	43,273,440	6,591,745	6,516	453,692	50,325,393
1929	46,644,206	576,393	47,220,599	7,091,680	5,762	532,392	54,850,433
1930	33,898,518	367,181	34,265,699	5,020,588	1,563	307,418	39,595,268

PRODUCTION OF STEEL CASTINGS

1922	425,981	404,767	830,748	47,733	1,045	154,982	1,034,508
1923	571,310	581,299	1,152,609	67,512	1,952	235,958	1,458,031
1924	456,518	402,901	859,419	53,437	1,377	206,549	1,120,782
1925	455,282	462,303	917,585	53,834	1,833	279,534	1,252,786
1926	480,627	505,379	986,006	43,066	2,041	326,445	1,357,558
1927	393,881	430,414	824,295	38,024	1,340	294,809	1,158,468
1928	381,926	458,590	840,516	28,450	1,253	348,568	1,218,787
1929	588,213	544,076	1,132,289	30,829	883	419,039	1,583,040
1930	369,798	413,675	783,473	14,871	690	305,181	1,104,215

PRODUCTION OF DUPLEX STEEL INGOTS AND CASTINGS

Years	Gross Tons	Years	Gross Tons	Years	Gross Tons
1916	3,436,457	1921	840,251	1926	2,815,980
1917	3,791,830	1922	1,651,089	1927	2,184,671
1918	3,870,017	1923	2,919,286	1928	2,232,197
1919	2,819,785	1924	2,131,856	1929	2,961,292
1920	3,279,119	1925	2,797,318	1930	2,045,277

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS

Years	Ingots	Castings	Total	Years	Ingots	Castings	Total
1917	1,576,806	67,529	1,644,335	1924	1,940,461	85,948	2,026,409
1918	1,721,367	66,485	1,787,852	1925	2,320,390	112,583	2,432,973
1919	1,435,816	45,372	1,481,188	1926	2,317,313	146,101	2,463,414
1920	1,591,939	68,353	1,660,292	1927	2,385,904	145,844	2,531,748
1921	769,293	40,255	809,548	1928	3,045,225	169,684	3,214,909
1922	1,614,392	59,104	1,673,496	1929	3,764,287	192,920	3,957,207
1923	2,014,269	92,220	2,106,489	1930	2,317,183	126,128	2,443,311

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Japanese Steel Works Plans Future Output

YOKOHAMA, JAPAN, April 1.—The Seitetsu Jo (Government Steel Works) estimates its production in the coming fiscal year, ending March 31, 1932, at 753,000 metric tons of steel products. This includes a program of 150,000 tons of large shapes and 95,000 tons of angles, 125,000 tons of round, square and flat bars, 110,000 tons of rails, and 125,000 tons of sheets and plates.

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New Aluminum Alloy Used in Germany

HAMBURG, GERMANY, April 22.—The aluminum-tungsten alloy "Benit," which is being commercially produced in Germany and entering into wider use in machinery and motor car construction, was developed by a French metallurgist, F. Benit. An American patent, No. 1,680,004, has been granted. The alloy contains 96.91 per cent aluminum, 2 per cent copper, 0.45 per cent magnesium and 0.27 per cent tungsten. The alloy is stated by the maker to show tensile strength of 30 kg. per sq. mm. and an elongation of 23 per cent. It is claimed that it may be remelted without impairing its physical and mechanical characteristics. It can be forged, welded, drawn or stamped and lends itself readily to both hot and cold working.

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George Hush, Jr., who is engaged in production engineering and is a distributer of machinery and industrial equipment, 519 National Building, Cleveland, has acquired additional floor space and will carry a permanent exhibit of products handled. Mr. Hush has added the lines of the Excelsior Plimptruck Co., maker of lift trucks; Wright-Hibbard Industrial Electric Truck Co., Inc., and B. G. Carpenter Co., Inc., maker of material handling equipment; the Hough Shade Corpn., manufacturer of industrial shades, and the Gehnrich Oven Co., Inc., maker of industrial ovens.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

MILL PRICES OF SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$30.00
Rerolling, 4-in. and under 10-in., Youngstown	30.00
Rerolling, 4-in. and under 10-in., Cleveland	30.00
Rerolling, 4-in. and under 10-in., Chicago	31.00 to 32.00
Forging quality, Pittsburgh	36.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$30.00
Youngstown	30.00
Cleveland	30.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.65c.
Universal	1.65c.
Sheared	1.65c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00 to $37.00
Cleveland	35.00 to 37.00
Chicago	35.00 to 37.00

PRICES OF RAW MATERIAL

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic or foundry, Swedish, average 65% iron	9.00c.
Manganese ore, washed 52% manganese, from the Caucasus	25c. to 27c.
Manganese ore, African or Indian, 50 to 52%	24c. to 26c.
Manganese ore, Brazilian, 46 to 48%	22c. to 24c.
Tungsten ore, high grade, per unit, in 60% concentrates	$12.00 to $12.50

	Per Gross Ton
Chrome ore, 45% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$20.00
Chrome ore, 48% Cr_2O_3 crude, c.i.f. Atlantic seaboard	22.50

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.50
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.75
Foundry, by-product, Ch'go ovens	7.50
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.50
Mine run coking coal, f.o.b. W. Pa.	1.40 to 1.50
Gas coal, 3/4-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	75c. to 85c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic 80% seaboard	*$80.00 to $85.00
Foreign, 80% Atlantic or Gulf port, duty paid	*80.00 to 85.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$28.00 to $30.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		Per Gross Ton Furnace	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	39.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$25.00	13%	$29.00
11%	26.00	14%	31.00
12%	27.00	15%	33.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$19.00 to $21.00	11%	$22.00 to $24.00
7%	19.50 to 21.50	12%	23.00 to 25.00
8%	20.00 to 22.00	13%	25.00 to 27.00
9%	20.50 to 22.50	14%	27.00 to 29.00
10%	21.00 to 23.00	15%	29.00 to 31.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd, carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	24.50c. to 26.00c.
Ferrochromium, 0.06% carbon	26.50c. to 28.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	122.50
Silico-manganese, gross ton, delivered	135.00

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$14.00
No. 2 lump, Illinois and Kentucky mines	17.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$40.00 to $43.00	$32.00 to $35.00
Maryland	40.00 to 43.00	32.00 to 35.00
New Jersey	40.00 to 43.00	.....
Ohio	40.00 to 43.00	32.00 to 35.00
Kentucky	40.00 to 43.00	32.00 to 35.00
Missouri	40.00 to 43.00	32.00 to 35.00
Illinois	40.00 to 43.00	32.00 to 35.00
Ground fire clay, per ton	6.50	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	49.00
Birmingham	47.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

MILL PRICES OF BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73
†Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	73
Hot-pressed nuts, blank or tapped, hexagons	73
C.p.c. and t. square or hex. nuts, blank or tapped	73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	73
Semi-finished hexagons castellated nuts, S.A.E.	73
Stove bolts in packages, P'gh.	80, 10, 10 and 5
Stove bolts in packages, Chicago.	80, 10, 10 and 5
Stove bolts in packages, Cleveland.	80, 10, 10 and 5
Stove bolts in bulk, P'gh.	80, 10, 10, 5 and 2½
Stove bolts in bulk Chicago.	80, 10, 10, 5 and 2½
Stove bolts in bulk, Cleveland.	80, 10, 10, 5 and 2½
Tire bolts	60, 10 and 10

Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread.	75 and 10
Upset hex. head cap screws, U.S.S.S. thread,	85 and 10
Upset hex. cap screws, S.A.E. thread.	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c. to 1.70c.
F.o.b. Chicago	1.70c. to 1.80c.
Del'd Philadelphia	1.94c. to 1.99c.
Del'd New York	1.98c. to 2.03c.
F.o.b. Cleveland	1.65c. to 1.70c.
F.o.b. Lackawanna	1.75c. to 1.80c.
F.o.b. Birmingham	1.80c.
C.i.f. Pacific ports	2.25c.
F.o.b. San Francisco mills	2.25c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.65c.
F.o.b. Birmingham, mill lengths	1.75c. to 1.80c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.50c. to 1.55c.
F.o.b. Chicago Heights mill	1.60c. to 1.65c.
Del'd Philadelphia	1.84c. to 1.89c.

Iron

Common iron, f.o.b. Chicago	1.70c. to 1.80c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Fittsburgh mill	1.65c. to 1.70c.
F.o.b. Chicago	1.70c. to 1.80c.
F.o.b. Birmingham	1.80c.
Del'd Cleveland	1.83½c.
Del'd Philadelphia	1.85½c.
F.o.b. Coatesville	1.75c. to 1.80c.
F.o.b. Sparrows Point	1.75c. to 1.80c.
F.o.b. Lackawanna	1.75c. to 1.80c.
Del'd New York	1.93c. to 1.98c.
C.i.f. Pacific ports	2.05c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c. to 1.70c.
F.o.b. Chicago	1.70c. to 1.80c.
F.o.b. Birmingham	1.80c.
F.o.b. Lackawanna	1.75c. to 1.80c.
F.o.b. Bethlehem	1.75c. to 1.80c.
Del'd Cleveland	1.83½c.
Del'd Philadelphia	1.76c.
Del'd New York	1.90½c. to 1.95½c.
C.i.f. Pacific ports	2.15c. to 2.25c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.60c. to 1.65c.
Wider than 6 in., P'gh	1.50c. to 1.55c.
6 in. and narrower, Chicago	1.70c. to 1.75c.
Wider than 6 in., Chicago	1.60c. to 1.65c.
Cooperage stock, P'gh	1.80c. to 1.90c.
Cooperage stock, Chicago	1.80c. to 1.90c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.15c. to 2.25c.
Strips, Cleveland	2.15c. to 2.25c.
Strips, deliv'd Chicago	2.43c. to 2.53c.
Strips, Worcester	2.30c. to 2.40c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.20c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

Bright wire	2.20c. to 2.30c.
Spring wire	3.20c. to 3.30c.

To Jobbing Trade

	Base per Lb.
Smooth annealed wire	2.35c. to 2.45c.
Smooth galvanized wire	2.80c. to 2.90c.
Polished staples	2.35c. to 2.45c.
Galvanized staples	2.60c. to 2.70c.
Barbed wire, galvanized	2.55c. to 2.65c.
Woven wire fence, per net ton	$60.00

	Base per Keg
Standard wire nails	$1.90 to $2.00
Smooth coated nails	1.90 to 2.00
Galvanized nails	3.90 to 4.00

To Retail Trade

	Base per Lb.
Bright wire	2.30c. to 2.40c.
Smooth annealed wire	2.40c. to 2.50c.
Smooth galvanized wire	2.90c. to 3.00c.

	Base per Keg
Standard wire nails	$2.00 to $2.10
Cement coated nails	2.00 to 2.10
Galvanized nails	4.00 to 4.10

	Base per Lb.
Polished staples	2.45c. to 2.55c.
Galvanized staples	2.70c. to 2.80c.
Barbed wire galvanized	2.65c. to 2.75c.
Woven wire fence per net ton	$65.00

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Light Plates

	Base per Lb.
No. 10, blue annealed, f.o.b. P'gh	1.85c.
No. 10, blue annealed, f.o.b. Chicago dist.	1.95c.
No. 10, blue an'l'd, del'd Phila.	2.14c. to 2.19c.
No. 10, blue annealed, B'ham	2.00c. to 2.05c.
No. 10, blue annealed, Pacific Coast ports	2.50c.

Sheets

Blue Annealed — Base per Lb.

No. 13, f.o.b. P'gh	2.00c.
No. 13, f.o.b. Chicago dist.	2.10c.
No. 13, del'd Philadelphia	2.29c.
No. 13, blue annealed, B'ham	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.15c. to 2.25c.
No. 24, f.o.b. Chicago dist. mill	2.35c.
No. 24, del'd Philadelphia	2.44c. to 2.54c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, c.i.f. Pacific Coast ports	3.00c.

Steel Furniture Sheets

No. 24, f.o.b. P'gh	3.40c. to 3.50c.

Galvanized

No. 24, f.o.b. Pittsburgh	2.80c.
No. 24, f.o.b. Chicago dist. mill	2.90c.
No. 24, del'd Cleveland	2.98½c.
No. 24, del'd Philadelphia	3.24c.
No. 24, f.o.b. Birmingham	2.80c. to 2.90c.
No. 24, c.i.f. Pacific Coast ports	3.50c.

Continuous Mill Sheets

No. 10 gage	1.70c.
No. 13 gage	1.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.55c. to 2.65c.
No. 28, f.o.b. Chicago dist. mill	2.65c. to 2.75c.

Automobile Body Sheets

No. 24, f.o.b. Pittsburgh	3.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill:	
Unassorted	3.15c.
Assorted	3.25c.
Primes only	3.35c.

Vitreous Enameling Stock

No. 10, Pittsburgh (carloads)	3.10c.
No. 20, Pittsburgh (carloads)	3.60c.

Tin Plate

Base per Box

Standard cokes, f.o.b. P'gh district mills	$5.00
Standard cokes, f.o.b. Gary	5.10

Terne Plate

(F.o.b. Morgantown or Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.30
15-lb. coating I.C.	12.90
20-lb. coating I.C.	14.00
25-lb. coating I.C.	$15.20
30-lb. coating I.C.	16.00
40-lb. coating I.C.	17.80

Alloy Steel Bars

(F.o.b. maker's mill)
Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1½% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	8.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

Per Gross Ton

Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

Base per 100 Lb.

Spikes, ⅝ in. and larger	$2.70
Spikes, ½ in. and larger	2.70
Spikes, boat and barge	$2.90
Tie plate, steel	1.95
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49⅛	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

FABRICATED STRUCTURAL STEEL

New Projects of 39,000 Tons Include 16,000-Ton Chicago Building—Awards Total 35,000 Tons

NEW fabricated structural steel projects total about 39,000 tons, compared with 103,000 tons a week ago. Awards of more than 35,000 tons compare with only 13,000 tons a week ago.

Included in new projects are 16,000 tons for a building in Chicago for the Marshall Field Estate, 7000 tons for a viaduct in Milwaukee, and 4100 tons for overhead crossings on the Santa Fe Railroad in Cook County, Ill.

Awards of structural steel include 7000 tons in the Outer Drive bridge in Chicago, 2000 tons for a World's Fair exhibition building in Chicago, and 15,000 tons in an overhead highway in New Jersey. Awards follow:

North Atlantic States

CHELSEA, MASS., 180 tons, street railway bus garage, to New England Structural Co.

CHELSEA, MASS., 180 tons, street rail tons, street railway bus garage, to New England Structural Co.

CHELSEA, 115 tons, naval hospital addition, to A. L. Smith Iron Works.

NEW YORK, 1695 tons, warehouse at 450 West Fourteenth Street, to Post & McCord.

NEW YORK, 750 tons, Hunter College gymnasium, to Hinkle Iron Works.

STATE OF NEW YORK, 150 tons, highway bridge, to American Bridge Co.

NEW YORK, 515 tons, garage and service station at East Sixty-third Street and York Avenue, to Hedden Iron Construction Co.

READING COMPANY, 300 tons, bridge, to American Bridge Co.

STATEN ISLAND, 350 tons, grade elimination for Staten Island Rapid Transit Railway Co., to Jones & Laughlin Steel Corpn.

ATTICA, N. Y., 800 tons, addition to State Prison, to an unnamed fabricator.

STATE OF NEW JERSEY, 150 tons, bridge on route 2, section 6, to American Bridge Co.

STATE OF NEW JERSEY, 15,000 tons, highway route 26, section 4, to Phoenix Bridge Co.

HASBROUCK HEIGHTS, N. J., 150 tons, grade crossing elimination, to American Bridge Co.

BUTLER, N. J., 500 tons, American Hard Rubber Co., to Goeller Iron Works.

OIL CITY, PA., 100 tons, National Transit Pump & Machine Co., to Pittsburgh Bridge & Iron Co.

The South

CHARLESTON, W. VA., 350 tons, building for Electro-Metallurgical Co., to Pittsburgh Bridge & Iron Co.

LOUISVILLE, 540 tons, bridge requirements for Louisville & Nashville Railroad, to Virginia Bridge & Iron Co.

TEXAS CITY, TEX., 300 tons, tank car for National Supply Co., to Pittsburgh-Des Moines Steel Co.

FORT WORTH, TEX., 225 tons, T. & P. Baggage Co., to North Texas Iron & Steel Co.

Central States

CLAY CITY, OHIO, 400 tons, Kelley Island & Transport Co., to American Bridge Co.

INDIANAPOLIS, 425 tons, grille for Indiana Bell Telephone Co., to Hetherington & Berner, local.

LOGAN COUNTY, ILL., 100 tons, highway bridges, to McClintic-Marshall Corpn.

CHICAGO, 175 tons, compressor building for Peoples Gas, Light & Coke Co., to Gage Structural Steel Co.; previously reported to an unnamed bidder.

CHICAGO, 450 tons, Halsted Street bridge, to McClintic-Marshall Corpn.

CHICAGO, 7000 tons, outer drive bridge, to American Bridge Co.

CHICAGO, 2000 tons, World's Fair Exhibition building, to Hansel-Elcock Co.

STATE OF ILLINOIS, 130 tons, bridges, to Vierling Steel Works, Chicago.

GRAND ISLAND, NEB., 550 tons, overhead crossing, to Paxton-Vierling Iron Works.

OMAHA, NEB., 200 tons, highway bridges, to Paxton-Vierling Iron Works.

Western States

PLUMMER, IDAHO, 250 tons, bridge to Minneapolis-Moline Power Implement Co.

OLYMPIA, WASH., 230 tons, bridge in Snohomish County, to Pacific Car & Foundry Co.

SEATTLE, 105 tons, hangar for King County, to Hofius Steel & Equipment Co.

SANTA BARBARA, CAL., 350 tons, bridge over San Roqui Creek, to Minneapolis-Moline Power Implement Co.

Canada

VICTORIA, B. C., 200 tons, bridge over Nechako River, to unnamed interest.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

DEERFIELD-GREENFIELD, MASS., 800 tons, State bridge.

EVERETT, MASS., 200 tons, New England Fuel & Transportation Co. coal mixing plant.

BOSTON, 150 tons, school in Charlestown district.

ALBANY, N. Y., 500 tons, warehouse for State of New York.

NEW YORK, 200 tons, Port of New York Authority office building.

NEW YORK, 700 tons, addition to public school No. 118, Queens.

STATE OF PENNSYLVANIA, 150 tons, small highway bridges.

CAMDEN, N. J., 1000 tons, Court House (Agostini Brothers, New York, general contractors).

STATE OF NEW JERSEY, 1300 tons, bridge at Teaneck, 500 tons, James Baradinio & Sons, Boonton, N. J., low for general contract; bridge at Englewood, 800 tons, F. F. Baker, Montclair, N. J., low for general contract.

READING, PA., 2700 tons, Berks County Court House; M. H. McCloskey Co., Philadelphia, general contractor.

The South

VERNON, TEX., 580 tons, State bridge across Red River.

OMAHA, TEX., 350 tons, State bridge across White Oak Creek.

STATE OF MISSISSIPPI, 650 tons, highway bridges.

Central and Northwest

CLEVELAND, 620 tons, Tuberculosis Hospital, previously reported as 500 tons.

TOLEDO, 150 tons, Lucas County bridge.

STATE OF ILLINOIS, 900 tons, highway bridges.

WABASH RAILWAY, 800 tons, grade separation work in Michigan.

CHICAGO, 1500 tons, Nurses' Home for Cook County hospital.

COOK COUNTY, ILL., 4100 tons, overhead crossings for Santa Fe railroad.

CHICAGO, 16,000 tons, Marshall Field Estate building.

JOLIET, ILL., 400 tons, Illinois Bell Telephone Co. building.

OMAHA, NEB., 350 tons, highway bridge.

MILWAUKEE, 7000 tons, Thirty-fifth Street viaduct.

GREEN BAY, WIS., 575 tons, State trunk highway construction; bids close May 14.

MADISON, WIS., 510 tons, State emergency relief construction; bids close May 6.

RHINELANDER, WIS., 300 tons, State trunk highway construction; bids close May 15.

RHINELANDER, WIS., 125 tons, Davenport Street bridge; general contract to Peppard & Fulton Co., Superior, Wis.

Western States

SACRAMENTO, CAL., 650 tons, Kress building.

KLAMATH, ORE., 300 tons, bridge.

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Foundrymen Open Convention in Chicago

Concentration on the problems of the foundry industry and avoidance of broadening its fields was urged by N. K. B. Patch, Lumen Bearing Co., Buffalo, in his presidential address at the opening Monday of the thirty-fifth annual convention of the American Foundrymen's Association in the Stevens Hotel, Chicago. He advocated a fostering of the group principle. To broaden the fields of an association too extensively means increasing costs, with effort spread too thinly over the industry. He said further that it is possible for such a society to be too large, and that it is a fact that managements of industries are seriously considering a reduction of memberships in associations. He contended that an intensive cultivation of existing fields will tend to hold memberships.

Registration for the convention and exhibition totaled about 2200 at noon Tuesday, which was in excess of the record in 1929, when a similar limited exhibition was held in the same place. Several technical sessions are being held simultaneously each day and are well attended.

▲▲▲ Non-Ferrous Metal Markets ▲▲▲

Copper, Tin and Zinc Drop to New Low Levels

NEW YORK, May 5.

THE WEEK'S PRICES, CENTS PER POUND FOR EARLY DELIVERY

	May 5	May 4	May 2	May 1	Apr. 30	Apr. 29
Lake copper, New York	9.87½	9.87½	9.87½	9.87½	9.87½	9.87½
Electrolytic copper, N. Y.*	8.75	8.75	9.25	9.25	9.25	9.25
Straits tin, spot, N. Y.	23.25	22.75	.....	23.25	23.15	23.75
Zinc, East St. Louis	3.25	3.35	3.35	3.37½	3.40	3.40
Zinc, New York	3.60	3.70	3.70	3.72½	3.75	3.75
Lead, St. Louis	3.80	3.80	3.80	3.80	3.80	3.90
Lead, New York	4.00	4.00	4.00	4.00	4.00	4.10

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

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COPPER

Copper has dropped to the lowest price in more than 30 years. Although the primary producers continue to quote 9.50c. a lb., delivered, custom smelters are offering metal at 9.25c., without getting business, and 9c. is quoted in the outside market, presumably because of forced liquidation. The small amount of copper that is being sold is going at 9c. Sales are only in small lots for immediate shipment, and, in fact, the holders will sell only for prompt shipment. No speculative purchases have been made, buyers evidently being afraid that 9c. may not be the bottom. An inquiry for 5000 tons from the Pennsylvania Railroad for electrification work was the only bright spot in the market. Some reports were that the order had been placed, but this could not be confirmed. The export price remains at 9.80c. a lb., c.i.f. European ports, but export buying, as well as domestic buying, is negligible. The erratic course of copper prices during the past few months is not such as to inspire confidence among buyers, some of whom have recently paid 1c. a lb. above today's prices, and extreme caution is now the order, with producers unable to predict the outcome.

COPPER AVERAGES

The average price of Lake copper, based on daily quotations in THE IRON AGE, is 10.03c. a lb., delivered, New York. The average price of electrolytic copper is 9.48c., refinery, or 9.73c., delivered in the Connecticut Valley.

TIN

Spot Straits tin was slightly higher in today's market, at 23.25c. a lb., after declining during the week to 22.75c., the lowest level since 1902. Weakness in the stock market, which was reflected in the tin market both here and abroad, and increasing supplies of tin account in large measure for the pronounced weakness. Publication of the monthly tin statistics on May 1 by the National Metal Exchange, showing a sizable increase in the visible supply, also had a depressing effect on the market. On only one day of the past week, April 30, was there any important activity, sales then having amounted to about 700 tons. United Kingdom warehouse stocks of this date are 28,007 tons, a gain of 677 tons in the week, in spite of shipment of 100 tons to the United States. London prices today were £103 15s. for spot standard, £105 2s. 6d. for future standard, £106 for spot Straits. The Singapore price was £105 10s.

LEAD

There was a sharp spurt in lead buying the past week, following repeated declines in prices, which brought lead quotations to 4c., New York, or 3.80c., St. Louis. Consumers who had bought lead at higher prices came into the market to average down their inventories. After this buying spurt, trading lapsed into the condition of small-lot buying for immediate needs that has characterized the market for some time. Some of last week's sales were between 200 and 300 tons each. Current quotations are steady and fairly firm.

ZINC

Further weakness has developed in zinc, and the price at which the metal was obtainable today was 3.25c. a lb., East St. Louis, or 3.60c., New York. Demand is light, being mostly for prompt and May shipment. Ore was sold on Saturday at $19 and $20. Ore production for last week is estimated

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	16.75c.
*Copper, hot rolled, base sizes	19.37½c.
Seamless Tubes—	
Brass	19.67½c.
Copper	22.87½c.
Brass Rods	15.00c.
Brazed Brass Tubes	25.12½c.

*Extra for cold-rolled, 3c. per lb.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	9.00c. to 9.50c.
Zinc sheets, open	10.00c. to 10.50c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	25.00c. to 26.00c.
Tin, bar	27.00c. to 28.00c.
Copper, Lake	10.75c. to 11.25c.
Copper, electrolytic	10.50c. to 11.00c.
Copper, casting	10.25c. to 10.75c.
Zinc, slab	4.50c. to 5.50c.
Lead, American pig	5.00c. to 6.00c.
Lead, bar	7.00c. to 8.00c.
Antimony, Asiatic	10.00c. to 10.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	24.00c. to 25.00c.
Alum. ingots, No. 12 alloy	23.00c. to 24.00c.
Babbitt metal, commercial grade	25.00c. to 35.00c.
Solder, ½ and ½	18.00c. to 19.00c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	27.50c.
Tin, bar	29.50c.
Copper, Lake	10.88c.
Copper, electrolytic	10.88c.
Copper, casting	10.25c.
Zinc, slab	5.50c.
Lead, American pig	5.00c. to 5.15c.
Lead, bar	7.75c.
Antimony, Asiatic	10.00c.
Babbitt metal, medium grade	15.00c.
Babbitt metal, high grade	23.00c.
Solder, ½ and ½	19.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.25c.	8.25c.
Copper, hvy. and wire	7.00c.	8.00c.
Copper, light and bottoms	6.00c.	6.75c.
Brass, heavy	4.00c.	5.00c.
Brass, light	3.50c.	4.50c.
Hvy. machine composition	6.00c.	7.00c.
No. 1 yel. brass turnings	4.50c.	5.00c.
No. 1 red brass or compos. turnings	5.75c.	6.50c.
Lead, heavy	2.75c.	3.25c.
Zinc	1.25c.	1.75c.
Sheet aluminum	10.00c.	12.00c.
Cast aluminum	5.00c.	7.50c.

at 5400 tons, with stocks about 55,000 tons, a slight decline from the previous week.

ANTIMONY

Chinese metal has declined to 6.70c. a lb., duty paid, New York, in a dull market, with futures quoted at ⅛c. a lb. lower.

NICKEL

Electrolytic cathodes are quoted at 35c. a lb., with shot and ingot made from remelted electrolytic at 36c. a lb. for single lots of spot metal.

ALUMINUM

Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 22.90c. a lb., delivered.

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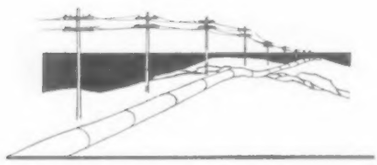

PIPE LINES

Projects Increasing—An Inquiry for 200 Miles

PIPE line projects are showing an encouraging increase. The Shell Oil Corpn. is inquiring for 200 miles of 10-in. pipe and the Atlantic Refining Co. is about to let contracts for 200 miles of 6 and 8-in. line. Developments of the week in this field are as follows:

Shell Oil Corpn., St. Louis, is inquiring for 200 miles of 10-in. pipe.

Pennsylvania Power & Light Co., Allentown, Pa., is surveying for a gas line from Tioga, Pa., to Williamsport and points south.

Illinois Commerce Commission has granted a certificate of convenience and necessity to the Panhandle-Illinois Pipe Line Co., Fairfax Building, Kansas City, Mo., authorizing construction and operation of a pipe line for transmission and sale of natural gas in more than 100 cities in south central Illinois.

Sun Oil Co., Philadelphia, is preparing to revive an old inquiry for pipe for a line in Ohio.

Montana Power Co., Butte, Mont., plans to build a pipe line for gas from Alberta, Canada, to Helena and Butte, Mont.

Montana-Dakota Power Co., Minneapolis, Minn., may extend its gas line to Bismarck, N. D.

North Central Gas Co. plans to lay a pipe line from Wyoming to western Nebraska.

Western Public Service Corpn., Scott's Bluff, Neb., may extend its gas line from Ogden, Utah, to Pocatello, Idaho.

Mid-Kansas Oil & Gas Co., operated by Ohio Oil Co., Findlay, Ohio, is considering construction of 10-in. pipe line from East Texas oilfields to central storage and distributing point soon to be selected, about 100 miles total, for oil transmission, reported to cost over $1,000,000 with booster stations and other equipment.

Sinclair Oil Co., 45 Nassau Street, New York, has completed surveys for pipe line from East Texas oilfields to point near Mexia, Tex., about 90 miles, to cost close to $1,000,000 with booster station and other equipment.

Michigan Gas & Electric Co., Three Rivers, Mich., is planning construction of a pipe line for natural gas supply to power plant at Marquette, Mich., where an expansion program will be carried out. It is proposed to furnish gas secured to Ishpeming and Negaunee, Mich., estimated to cost close to $200,000.

Magnolia Petroleum Co., Dallas, Tex., has work nearing completion on new pipe line for oil service from Kilgore to Center, Tex., to cost about $1,000,000 with pumping stations and other operating facilities.

Electric Bond & Share Co. has placed 35,000 tons of 20-in. gas pipe for a line in Montana with A. O. Smith Corpn., Milwaukee.

Atlantic Refining Co., Philadelphia, has ordered 9000 tons of 6 and 8-in. steel pipe for a gasoline line from Point Breeze, Pa., to the New York State boundary to National Tube Co.

Ohio Oil Co. has placed an order for 9000 tons of line pipe with A. O. Smith Corpn., Milwaukee.

A Standard Oil Co. line in New England, to run from Providence, R. I., to Worcester, Mass., calling for about 10,000 tons of pipe, will be placed shortly.

The Columbia Gas & Electric Co. is expected to place an order for 12,000 tons or more of gas line pipe within a few days.

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Railroad Equipment

Union Pacific has ordered six air dump cars from Differential Steel Car Co.

United Verde Copper Co. has ordered four air dump cars from Western Wheeled Scraper Co.

Cudahy Packing Co. has ordered steel parts for 25 car underframes from Pullman Car & Mfg. Corpn.

Canadian National has ordered three cafe-parlor cars and two sleeping cars from Canadian Car & Foundry Co.

Northern Pacific is in the market for 500 underframes for box cars and will take prices soon on 500 superstructure sets.

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Wheeling Steel's Loss $628,623 in Quarter

The Wheeling Steel Corpn., Wheeling, W. Va., in the quarter ended March 31, had net loss of $628,623, compared with a profit of $1,253,224 in the corresponding quarter of last year.

According to an announcement by W. W. Holloway, president, a proposal to change the capital structure of the company has been approved by the board of directors and will be submitted to stockholders at a special meeting on June 2. Under the terms of the proposal, one share of the 8 per cent preferred stock would be exchanged for 1⅓ shares of new 6 per cent preferred $100 par value stock; one share of 10 per cent preferred stock would be exchanged for 1⅔ shares of new 6 per cent preferred cumulative $100 par stock, and one share of $100 par common stock would be exchanged for one share of new common, no par value.

Reinforcing Steel

Awards in Larger Volume—New Projects Small

REINFORCING steel lettings the past week totaled 4800 tons, compared with 4000 tons in the previous week. The largest award was 1200 tons for subway work in Philadelphia. Contracts in April amounted to 30,950 tons compared with 30,400 tons in March and 20,300 tons in February. New inquiries have fallen to a smaller volume, adding only 1500 tons to projects pending. Awards follow:

LYNN, MASS., 260 tons, telephone exchange, to Joseph T. Ryerson & Son, Inc.

YONKERS, N. Y., 100 tons, grade crossing elimination, to Concrete Steel Co.

PHILADELPHIA, 1200 tons, Broad Street subway, to Truscon Steel Co.

ATTICA, N. Y., 400 tons, addition to State prison, to Capitol Steel Corpn.

WASHINGTON, 400 tons, hydraulic laboratory for Bureau of Standards, to Buffalo Steel Co., Tonawanda, N. Y.

WASHINGTON, 170 tons, warehouse for Thomas Somerville Co., to Rosslyn Steel & Cement Co., Rosslyn, Va.

CLEVELAND, 150 tons, John Carroll University, to Patterson-Leitch Co.

NEW ORLEANS, 600 tons, store for Feibelman Realty Co., to Joseph T. Ryerson & Son, Inc.

AURORA, ILL., 185 tons, hospital, to Calumet Steel Co.

WINNETKA, ILL., 180 tons, filtration plant, to American System of Reinforcing.

SOUTH BEND, IND., 200 tons, buildings at Notre Dame University, to an unnamed bidder.

SACRAMENTO, CAL., 138 tons, paving in Los Angeles County, to an unnamed bidder.

SACRAMENTO, 305 tons, bridge over San Dieguito River, San Diego County, to an unnamed bidder.

RENTON, WASH., 100 tons, high school, to an unnamed company.

YAKIMA, WASH., 400 tons, hotel, to Pacific Coast Steel Corpn.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

DEERFIELD-GREENFIELD, MASS., 200 tons, State bridge.

PENNSYLVANIA RAILROAD, 8000 tons, electrification from Washington to New York; all bids rejected and inquiry will be reissued.

HEIDLERSBURG, PA., 250 tons, road work; Lutz Contracting Co., Canton, Ohio, general contractor.

CLEVELAND, 250 tons, County bridges.

KANSAS CITY, MO., tonnage being estimated, Post Office.

CHICAGO, 100 tons, building for World's Fair group.

MADISON, WIS., 260 tons, State emergency relief construction; bids closed May 6.

GREEN BAY, WIS., 100 tons, State trunk highway construction; bids close May 14.

LOS ANGELES, 4000 tons, Sixth Street viaduct; bids opened.

SACRAMENTO, CAL., 220 tons, paving in Sacramento County; bids May 20.

SACRAMENTO, 125 tons, four bridges in Tulare County; bids May 20.

Where Steel Exports Went in First Quarter

Canada Took 62,536 Tons of Nine Leading Items—Japan Lost Second Position to Mexico, 6794 Tons, Followed by Chile, 6720 Tons; Japan, 6585 Tons; Philippines, 4622 Tons; Argentina, 3397 Tons

Exports from United States, by Countries of Destination

(In Gross Tons)

Steel Plates

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*6,253*	*13,653*	*13,920*	*34,541*
Canada	5,173	11,098	11,802	27,537
Japan	10	74	10	994
Cuba	23	7	132	358
Philippine Islands	43	114	189	262
Mexico	25	42	242	469
Argentina	....	....	....	....
Chile	....	....	....	....
Colombia	....	....	....	....

Galvanized Sheets

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*1,805*	*12,362*	*12,060*	*29,869*
Canada	489	2,869	1,704	8,277
Japan	1	507	44	1,136
Cuba	187	496	288	1,162
Philippine Islands	1,574	3,696	1,913	7,691
Mexico	475	592	1,237	1,260
Argentina	6	200	39	660
Chile	....	....	967	....
Colombia	135	160	706	496

Black Steel Sheets

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*7,973*	*13,959*	*23,111*	*38,881*
Canada	1,738	8,208	12,144	21,479
Japan	244	1,586	580	4,906
Cuba	22	102	51	173
Philippine Islands	660	36	748	861
Mexico	103	495	103	885
Argentina	79	646	981	1,269
Chile	....	....	1,284	....
Colombia	3	3	39	87

Steel Rails

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*3,724*	*8,668*	*10,121*	*24,179*
Canada	449	1,020	740	1,649
Japan	1,008	426	1,119	1,657
Cuba	....	120	11	997
Philippine Islands	1,048	242	1,479	1,281
Mexico	....	137	85	309
Argentina	....	91	....	293
Chile	1	5,555	301	8,119
Colombia	....	....	....	1,032
Brazil	....	325	61	989

Barbed Wire

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*2,163*	*3,319*	*7,169*	*8,636*
Canada	642	327	703	607
Japan	....	....	....	....
Cuba	154	182	296	577
Philippine Islands	61	40	234	259
Mexico	456	771	1,326	1,798
Argentina	....	576	84	984
Chile	13	159	43	261
Colombia	143	52	212	267
Brazil	72	253	1,780	841

Plain and Galvanized Wire

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*1,101*	*2,729*	*3,271*	*5,698*
Canada	373	1,178	891	2,461
Japan	55	64	93	147
Cuba	77	73	133	327
Philippine Islands	31	37	59	132
Mexico	139	200	246	537
Argentina	16	312	624	1,075
Chile	20	129	89	369
Colombia	42	23	136	87
Brazil	24	57	138	184

Tin Plate

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*8,522*	*23,000*	*23,854*	*69,679*
Canada	501	4,770	776	9,812
Japan	2,247	9,356	4,523	23,664
Cuba	702	681	918	1,203
Mexico	1,427	964	3,023	3,702
Argentina	255	734	1,580	4,003
Chile	122	282	558	972
Brazil	68	249	1,074	923
China	943	2,740	2,628	8,476
British India	....	....	....	5,217
United Kingdom	....	....	....	....
Italy	181	330	356	2,190

Steel Bars

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*5,823*	*9,836*	*14,936*	*29,718*
Canada	2,634	4,966	8,044	15,800
Japan	1	847	49	1,174
Cuba	58	134	102	517
Mexico	16	145	63	298
Argentina	....	11	72	59
Chile	945	274	1,492	591
Brazil	40	10	123	282
China	75	....	205	....
British India	....	....	....	....
United Kingdom	974	1,584	1,607	5,793
Italy	....	....	....	....

Plain Heavy Structural Material

	March		3 Months Ended March	
	1931	1930	1931	1930
Totals	*11,540*	*16,773*	*28,288*	*56,178*
Canada	10,465	13,414	25,732	37,719
Japan	1	858	167	2,529
Cuba	32	836	52	1,465
Mexico	35	....	169	81
Argentina	1	....	7	206
Chile	316	429	2,116	710
Brazil	....	....	....	....
China	....	....	....	....
British India	....	....	....	....
United Kingdom	....	....	....	....
Italy	....	....	....	....

Destination of Iron and Steel Exports

(In Gross Tons)

Country	March, 1931	Feb., 1931	March, 1930	January Through March 1931	January Through March 1930
North and Central America and West Indies	*67,405*	*53,561*	*121,425*	*171,056*	*310,724*
Canada and Newfoundland	55,841	45,159	101,230	142,609	251,682
Cuba	2,147	1,289	4,267	4,589	12,290
Guatemala	306	89	308	600	989
Honduras	278	213	1,168	749	2,513
Mexico	4,997	3,536	10,976	12,931	28,502
Panama	1,486	1,800	1,166	4,189	5,464
British West Indies	513	572	829	1,448	3,645
Other West Indies	1,097	518	992	2,369	4,096
Other Central America	746	385	489	1,562	1,543
South America	*8,569*	*12,593*	*29,279*	*32,208*	*81,919*
Argentina	870	2,781	3,940	8,179	11,579
Brazil	716	2,348	4,282	5,807	11,514
Chile	2,925	2,961	10,621	14,527	22,582
Colombia	765	1,145	1,762	3,411	8,443
Peru	1,858	1,794	1,351	4,843	4,667
Uruguay	283	623	1,182	1,565	3,980
Venezuela	1,030	759	5,939	3,466	17,269
Other South America	122	182	202	410	1,484
Europe	*8,889*	*5,819*	*22,724*	*20,338*	*68,620*
Belgium	70	162	1,532	344	2,251
France	1,487	1,701	767	4,674	2,557
Germany	153	104	943	351	3,641
Italy	415	463	9,595	1,296	25,644
Norway	202	148	455	469	1,270
Soviet Russia	496	10	217	524	1,908
Spain	50	19	75	63	10,411
United Kingdom	2,550	2,803	3,311	8,113	12,013
Other Europe	3,486	409	5,829	4,504	8,925
Far East	*22,230*	*18,531*	*63,782*	*55,361*	*193,353*
British Malaya	96	113	632	690	2,931
China	4,916	6,590	4,475	14,086	15,538
Netherlands East Indies	729	997	5,579	2,594	13,227
India and Ceylon	1,362	1,552	619	3,816	9,009
Hong Kong	896	1,251	51	2,652	1,442
Japan	8,225	4,882	39,650	17,921	119,107
Kwantung	14	147	886	188	1,350
Philippine Islands	5,644	2,417	10,155	11,600	22,709
Australia	151	279	850	737	3,666
New Zealand	42	111	119	354	1,269
Other Asia and Far East	155	192	766	719	3,105
Africa	*2,419*	*708*	*1,119*	*1,516*	*4,764*
Union of South Africa	237	144	665	1,057	1,166
Egypt	1,163	52	32	1,289	2,267
Mozambique	371	472	151	985	755
Other Africa	648	40	271	1,185	576
Totals	109,512	91,212	238,329	293,469	659,220

British See Worst of Depression Over Following Improved First Quarter

(By Cable)

LONDON, ENGLAND, May 4.

THE Federation of British Industries states that the past quarter witnessed a perceptible improvement in domestic business in the principal industrial countries. While the improvement was primarily seasonal it helped confirm the impression that the worst of the depression is over.

The Federation holds the view that the process of recovery necessarily will be slow and premature optimism may lead to disappointment.

General conditions in Great Britain are unchanged, but it is believed that confidence will be somewhat restored with budget fears allayed.

Cleveland producers report slight improvement, with April Tees shipments 56,000 tons despite a cessation of exports to Australia and South America. Foundry pig iron demand is poor, consumers pressing for lower prices, but makers refusing reductions. Hematite prices are sagging and sellers on the East Coast have accepted £3 5s. 6d. ($15.92) and lower.

Steel buying is limited and shipbuilders are urging the mills to grant concessions, but the Steel Association has refused.

Continental markets are depressed as a result of decreased orders, and prices are declining. United Kingdom users of European steel are disinterested in buying as they are unable to sell their own finished products. The market is believed likely to decline further based on rumor of a failure in Greece involving a Belgian steel works.

Tin plate is dull with about 250 mills operating irregularly and booking orders at low prices. Makers have accepted 14s. 9d. ($3.58) per base box, f.o.b. works port, for special orders. The general market price is 15s. to 15s. 6d. ($3.65 to $3.77). Certain idle mills are unwilling to reopen until they can obtain 16s. ($3.89) per base box. Export demand is small, mostly from the Continent and some business from the Far East.

Galvanized and black sheets are quiet, with many mills closed.

Clyde output in April was 8500 tons of shipping.

The Barrow Hematite Steel Co., Ltd., closed its rail mills May 2, on completion of current contracts.

John Summers & Sons announce that the Hawarden Bridge Steel Works is closing its steel bar mills and the sheet mills will operate as demand permits. High grade steel for the motor and allied industries will be obtained from a subsidiary company.

The London & Northeastern Railway is laying one mile of experimental track with 95-lb. rails, 90 ft. long, to discover if fewer rail joints will provide smoother running.

The Britain Ferry Steel Co. is reported planning to reconstruct its works with a new electric plant, and may build blast furnaces.

Sir John Beale, chairman of the board, Guest, Keen & Nettlefolds, at the annual meeting stated that works of the company still open are operating at a profit and are fairly well booked for the rest of the year. Rationalization in the South Wales steel industry is not yet accomplished, he said, but his company has centralized as a preliminary. If protection were to be introduced immediately, he

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British railroad lays experimental track section with 95-lb. rails, 90 ft. long.

* * *

Remodeling British steel plant to cost close to $11,000,000.

* * *

Soviet Union expected to have annual supply of 2,250,000 tons of iron ore for export.

* * *

South African interests inquire in Germany for metal-working equipment to be ready when new Pretoria steel plant is complete.

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Work Started on Haifa-Bagdad Railway and plans made for Tripoli-Irak and Mosul-Bagdad lines.

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British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.8665 (par)

British Prices, f.o.b. United Kingdom Ports

Ferromanganese, export	£9	0s.	to	£11	5s.	$43.74	to	$54.75
Billets, open-hearth	5	2½	to	5	10	24.91	to	26.76
Black sheets, Japanese specifications	10	5				49.82		
Tin plate, per base box	0	15	to	0	15½	3.65	to	3.77
						Cents a Lb.		
Steel bars, open-hearth	7	17½	to	8	7½	1.71	to	1.81
Beams, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Channels, open-hearth	7	12½	to	8	2½	1.66	to	1.76
Angles, open-hearth	7	7½	to	7	17½	1.60	to	1.71
Black sheets, No. 24 gage	8	10				1.84		
Galvanized sheets, No. 24 gage	11	0				2.42		

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2	9s.	to	£2	10s.	$11.90	to	$12.15
Billets, Thomas (nominal)	£3	7s.	to	£3	8s.	$16.28	to	$16.52
Wire rods, low C., No. 5 B. W. G.	5	2½	to	5	7½	24.94	to	26.15
Rails, light	6	0				29.20		
Black sheets, No. 31 gage, Japanese	11	5	to	12	12	54.68	to	58.32
						Cents a Lb.		
Steel bars, merchant	3	15	to	3	16	0.81	to	0.82
Beams, Thomas, British standard (nominal)	3	10	to	3	11	0.78	to	0.79
Channels, Thomas, American sections	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	3	14	to	3	15	0.80	to	0.81
Angles, Thomas, 3-in.	3	16	to	3	17	0.82	to	0.83
Hoop and strip steel over 6-in. base	4	7½				0.94		
Wire, plain, No. 8 gage	4	18½				1.08		
Wire, barbed, 4-pt. No. 12 B.W.G.	8	12½				1.90		

pointed out, Guest, Keen & Nettlefolds would be unable to meet the demand.

The British Steel Co., part of the Guest, Keen, Baldwins group, has decided to remodel the Cardiff works at a preliminary expenditure of £1,500,000 ($7,290,000) and an eventual total expenditure of £2,250,000 ($10,935,000). The British Steel Co. now holds liquid resources, including stocks of pig iron, iron ore and scrap, in excess of debts totaling £1,000,000 ($4,860,000).

Difficulties are reported between German mills and Soviet trade delegates on prices for large Russian steel orders, the Soviet desiring to adopt as a basis the current Brussels exchange rates, plus 21 months' credit. It is believed that an agreement will be reached shortly, but the banks are cautious.

In Luxemburg the Steinfort works is closing its blast furnace and steel plant, possibly permanently.

Belgian output in March was 263,000 tons of pig iron, 242,000 tons of raw steel, and 200,000 tons of rolled steel. At the end of March 43 furnaces were in blast.

Preliminary work has been started on the Haifa-Bagdad Railway, which is scheduled for completion in 1935.

France is proposing to construct a Tripoli-Irak frontier railroad, the Irak authorities to build a Mosul-Bagdad line.

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German Steel Interest Ends Soviet Concession

ESSEN, GERMANY, April 20.—The concession in the Northern Caucasus operated by the Friedrich Krupp A. G. since 1921 has been abandoned following investment of several million dollars by the Krupp company in a plant for manufacture of agricultural machinery and other products. This was the last of the concessions operated in Russia by German steel interests.

Russian Iron Ore May Be Exported Soon

HAMBURG, GERMANY, April 22.—It is reported that the U. S. S. R. will shortly have from 2,000,000 to 2,250,000 tons of hematite iron ore available annually for export sale. Since the war Russia has not exported iron ore, confining foreign sales of ore to manganese. The Russian iron ores are high in iron and silica content and are expected to be offered at low prices, which may have a disturbing effect on Spanish and Swedish iron ore business.

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Ford Plant in Cologne to Operate Soon

COLOGNE, GERMANY, April 20.—After a brief delay, the new plant of the Ford Motor Co. here will enter into production in the first week of May with a scheduled output of 140 cars a day as a preliminary program.

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Soviet Ship Purchase Will Aid German Yards

HAMBURG, GERMANY, April 22.—Shipyards, which are greatly in need of new contracts for ship construction, are negotiating with such German shipping interests as Hapag, and the North German Lloyd Line, for shipbuilding orders, including six motor vessels of 14,000 tons and four motor ships of 12,000 tons.

In addition, shipbuilders here are looking forward to orders for 90,000 to 100,000 tons of shipping to replace old vessels recently sold to the U. S. S. R., subject to approval by the Government of the financing plan arranged. This sale included 12 vessels ranging from 5000 to 10,000 tons each, which the Soviet Union bought for transport of oil and timber. If the financial terms of the sale are approved, replacement business should provide some tonnage to German yards for the next year.

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South Africa Building Metal-Working Plants

HAMBURG, GERMANY, April 22.—Progress in the construction of a steel plant near Pretoria, South Africa, for the South African Iron & Steel Industrial Corpn. is being reflected in a number of inquiries received in Germany for complete equipment to build hardware manufacturing and other metal-consuming plants. These include inquiries for wire drawing, wire nail making, bolt and rivet machinery. In the next few weeks a contract is expected to be placed for an ore crushing plant to cost about $1,000,000.

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Soviet Buys 6000 Tons of European Aluminum

HAMBURG, GERMANY, April 22.—Following purchase recently of 9000 tons of aluminum in Norway, the Soviet Union has placed a contract with the Continental Aluminum Cartel for 6000 tons at an average price of £78 a ton (17.19c. a lb.). This was a concession of about £7 a ton, as the cartel open quotation for aluminum is £85 a ton (18.74c. a lb.). The lower price is said to have been necessary to meet American competition for the business.

In the past week the Soviet Union has placed orders for aluminum production equipment to a total of $850,000, which includes a $500,000 aluminum rolling mill to be furnished by the Schloemann A. G., Dusseldorf.

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A saw disk recently made by Edgar Allen & Co., Ltd., Sheffield, England, has a diameter of 102 in. and when completed will be used for sawing large blocks of building stone.

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NEW BATTLE CRUISER

THE new battle cruiser Chicago, as she appeared at anchor in San Francisco Bay previous to sailing on her maiden voyage. The cruiser is to be the flagship of the Pacific Fleet, and is declared to be the last word in naval cruiser construction.

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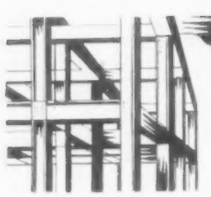

PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Business Continues Very Dull

Immediate Outlook Not Promising—Electrical Company Buys $55,000 Lathe

MACHINE tool business throughout the country has started out this month in a state of extreme dullness. April buying was generally below that of March, and the outlook is not promising for any immediate gains.

In the East, the only feature was the purchase of a large lathe, costing about $55,000, by an electrical company. At Cleveland, the Board of Education is inquiring for four lathes, but otherwise orders and inquiries are very slow. The Chicago trade expects some orders soon from the Union Pacific Railroad. A few orders are being received from the Santa Fe. Cincinnati machine tool builders report a decline in new business, which is having an effect upon operations.

The failure of the seasonal improvement in business to carry through April seems to have caused the postponement of a good deal of equipment buying that had been tentatively under consideration. Under such circumstances, the machine tool trade looks for no favorable change in the situation until there are definite signs of an upward business trend.

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NEW YORK

The purchase of a $55,000 lathe by a large electrical company was the only feature of a week of routine machine tool business. The first few days of May brought no change in the situation, and it would appear from prospects now in sight that this month's business will run about even with that of last month, which showed a decline from March for most of the sellers in this district.

NEW ENGLAND

Local machine dealers and builders report business extremely quiet. Some manufacturers who have been working for several weeks on equipment purchased by a Massachusetts company have been notified that the buyer has postponed deliveries indefinitely. The amount of tools involved was large and included one machine listed at $21,000.

Small tool sales are holding up well, some makers reporting a slight increase in April bookings compared with March.

CHICAGO

May opens with few changes in sight for machine tool sales in this district. Old inquiries and new requests for prices hold some promise, but dealers can discern nothing more tangible than "a slightly better feeling." It is said that the Illinois Steel Co. has closed for all of its immediate needs. The Santa Fe is buying and the Union Pacific may soon place orders against its list. The Milwaukee Road is tabulating bids and asking here and there for additional information. The city of Milwaukee is asking for quotations on a 16-in. lathe.

CINCINNATI

As a result of a slight decline in demand for machine tools in this district, the market appears poorer than a week or two ago. Orders for single tools have filtered in, but these are so few as to be almost negligible. One local manufacturer has reduced operations to such an extent that his plant is practically closed. Inquiry also has slackened.

MILWAUKEE

The April volume of machine tool sales failed to meet expectations of most manufacturers and dealers, although one or two report business slightly improved over March. Encouragement is found in the relatively good employment situation in the metal-working industry, the payroll at the beginning of May comparing well with a month before. New industrial construction is going on in a very small way. Hundreds of men are being put to work on the enlarged State highway construction program and the State emergency relief projects, which call for a considerable volume of structural shapes, reinforcing bars, metal culverts and the like, are also creating a demand for motor trucks, power shovels and other machinery.

CLEVELAND

The machine tool market continues dull and there is little expectation of an improvement during May. The only new inquiry, aside from single machines, is from the Cleveland Board of Education for four lathes for the West Technical High School. Railroads in this territory are buying no equipment and orders from metal-working industries are limited to single machines. Orders from the motor car industry in the Michigan territory are scarce. Dealers are centering efforts largely on replacement business, and while users are showing an interest in the purchase of tools to replace obsolete equipment, the general attitude is to defer buying until business improves.

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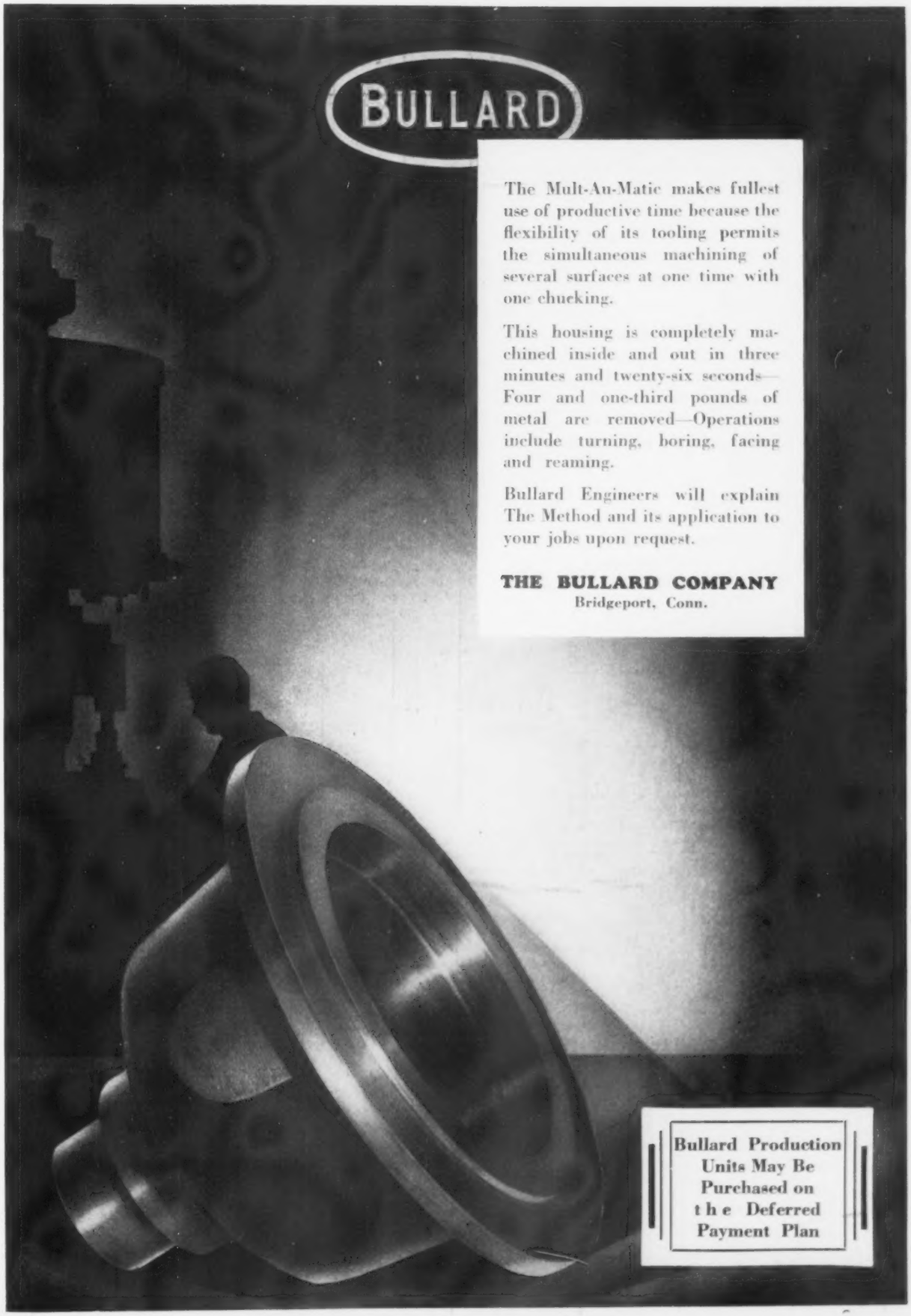
New York

PLANS are being completed by Albany Port District Commission, Albany, N. Y., Peter G. Ten Eyck, chairman, for a new grain elevator on Waterloo Island, with capacity of 1,500,000 bu., to cost $1,800,000 with elevating, conveying, screening and other handling equipment. Work is scheduled to begin early in summer.

Department of Hospitals, Municipal


BULLARD
The Mult-Au-Matic makes fullest use of productive time because the flexibility of its tooling permits the simultaneous machining of several surfaces at one time with one chucking.
This housing is completely machined inside and out in three minutes and twenty-six seconds—Four and one-third pounds of metal are removed—Operations include turning, boring, facing and reaming.
Bullard Engineers will explain The Method and its application to your jobs upon request.
THE BULLARD COMPANY
Bridgeport, Conn.
Bullard Production Units May Be Purchased on the Deferred Payment Plan

Building, New York, is arranging call for bids for power plant at Kings County Hospital, Brooklyn, to cost over $500,000 with equipment. LeRoy P. Ward, 205 East Forty-second Street, New York, is architect.

George E. Riegel, 14 Omar Road, Pelham Manor, N. Y., and associates have organized Steel-Clad Products Co., with capital of $50,000, to operate a plant at New York for manufacture of steel drums, barrels, cartons and kindred containers. Frank G. Perkins, 118 Willard Avenue, Bloomfield, N. J., is interested in organization.

Department of Water, Gas and Electricity, Municipal Building, New York, has awarded general contract to Michael J. Mallin, 161 Isabella Avenue, Dongan Hills, Staten Island, for two-story equipment and repair shop at Tottenville, 50 x 85 ft., to cost close to $50,000 with equipment.

Safeturn Signal Corpn., New York, recently organized by Oscar Muller, 385 Central Park West, and associates, plans operation of local factory for manufacture of automobile signal devices and equipment. Robert H. Greene, 101 Essex Avenue, Montclair, N. J., is interested in new company.

Board of Education, Park Avenue and Fifty-ninth Street, New York, is completing plans for new four-story Franklin K. Lane High School in Brooklyn, to be largest institutional unit of kind in country, with complete vocational training shops, to cost $3,000,000 including equipment. Work is expected to begin soon. William C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect for board.

Bates Valve Bag Co., 60 East Forty-second Street, New York, manufacturer of heavy paper containers, has leased new one-story plant, 100 x 240 ft., to be erected at New Orleans, for new branch works, to cost over $150,000 with machinery. It is expected to have unit ready for occupancy in August. Company is a subsidiary of St. Regis Paper Co., address noted. Work is being completed on another branch plant at Seattle, Wash., to cost over $125,000.

Department of Parks, Arsenal Building, New York, has plans for one-story shop and service building, 35 x 105 ft., in Brooklyn, to cost about $35,000 with equipment.

Board of Education, Essex County Vocational Schools, Hall of Records, Newark, is asking bids until May 11 for equipment and supplies for new Boys' Vocational School, Bloomfield, as follows: Machine tools, equipment, materials and supplies; steel lockers, benches, steel bins, cabinets, stools and tables; tools, equipment and supplies for auto mechanics department; tools and equipment for plumbing, carpentry, and electrical departments; drafting supplies, and school furniture. Robert O. Beebe is director. Bids are being asked until May 13 for spraying equipment for cabinet-making department at Boys' Vocational School, Newark.

Imperial Appliance Corpn., Newark, manufacturer of electrical equipment and appliances, has leased 10,000 sq. ft. floor space in four-story building at 123 Sussex Avenue, for establishment of new plant.

Western Electric Co., 195 Broadway, New York, will use former plant of Ford Motor Co., Kearny, N. J., recently acquired, for manufacture of special radio equipment, operating in conjunction with Kearny works on adjoining site, for production of telephone equipment, cables, etc. Company will remove instrument shop at Philadelphia to Ford plant and will install other machinery for radio communication apparatus, speech devices, precision equipment, etc. Plant will be ready for service late in summer.

North Jersey District Water Supply Commission, 24 Commerce Street, Newark, will receive bids until May 14 for equipment storage and distributing building at Wanaque, N. J., one story, 37 x 85 ft., with rolling steel doors, crane runway and 10-ton hand-operated traveling crane; also for 2260 ft. of 7-ft. high chain-link wire fencing for balancing reservoir, Clifton, N. J. Neil C. Holdredge is assistant chief engineer.

Board of Education, West Orange, N. J., has plans for new three-story junior high school, with manual training department, to cost $550,000, for which bids will soon be asked on general contract.

Portable Machinery Co., Clifton, N. J., manufacturer of special conveying equipment, has been consolidated with A. B. Farquhar Co., Ltd., York, Pa. Main offices and factory of Portable company will be moved to York, but branch factory and service station will be permanently maintained at Clifton. There will be no change in management of Portable Machinery Co.

Helwig Welding & Supply Co., 40-42 Cordier Street, Irvington, N. J., has been appointed distributer for Prest-O-Weld welding and cutting equipment, Purox welding wire, also Linde and Prestolite gas.

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Philadelphia

DEPARTMENT of City Transit, City Hall Annex, Philadelphia, is asking bids until May 19 for rails and fittings, special trackwork and channels. C. E. Myers is director.

Sun Oil Co., 1608 Walnut Street, Philadelphia, has asked bids on general contract for a new bulk oil storage and distributing plant near Taggertsville, Pa., including motor truck service and garage unit, to cost over $50,000 with equipment.

Henry B. Swaab, 1106 Prospect Avenue, Melrose Park, Pa., and associates have organized Superior Bearings Co. to operate a plant for manufacture of automobile bearings, automobile parts, etc. J. Barnard Halpern, 2501 North Thirty-third Street, is interested in organization.

Quaker City Iron Works, Richmond and Tioga Streets, Philadelphia, is removing its plant to larger quarters. Present plant has been placed on market, including several cranes and other equipment.

Commissioner of Institutions and Agencies, State Office Building, Trenton, N. J., will receive bids until May 13 for erection of hangar at Newark Airport, Newark; until May 19 for power plant piping and auxiliary equipment for power house at hospital at Skillman. William J. Ellis is commissioner.

In connection with new mill on site in Diamond Flats section, Scranton, Pa., recently acquired, Princeton Rayons, Inc., 150 Madison Avenue, New York, contemplates steam power house, machine shop and other units. Entire project will cost over $250,000.

Moore Body Co., South Temple, Pa., has been organized by Walter J. Hansen, 932 Hamilton Place, Wyomissing, Pa., and associates to operate a plant for manufacture of steel automobile bodies, hoisting apparatus, container bodies, etc. John N. Budde, 366 Myrtle Avenue, Irvington, N. J., is interested in company.

Hand-saw department of Disston saw works, Tacony, Philadelphia, has been working overtime for three weeks. Lower prices for company's standard hand saws and a new line have brought about improvement in its business.

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South Atlantic

CITY Council, Richmond, Va., is considering appropriation of more than $1,000,000 for extensions and improvements in municipal electric light and power plant, including installation of additional equipment.

Chemical Warfare Service, Edgewood Arsenal, Md., will receive bids until May 11 for indicating pressure gages, automatic controllers, flow meters, recording gages and other measuring equipment.

Baltimore Tool Works, Inc., 108 Grant Street, Baltimore, has acquired former one and two-story factory of C. C. Lang & Son, 1110 Race Street, and will remodel for new plant.

Superintendent, St. Elizabeth's Hospital, Washington, will receive bids until May 18 for furnishing and installing one 15-ton capacity, hand-power traveling crane.

City Council, Cumberland, Md., will take bids for new dam at Evitt's Creek, in connection with extensions and improvements in municipal water system. A fund of $750,000 has been authorized for project, including equipment.

Hickory Chair Mfg. Co., Hickory, N. C., has been organized with capital of $1,000,000 to consolidate company of same name, with local plant, Hickory Furniture Co., and Martin Furniture Co., manufacturers of other furniture products. New company plans general expansion program. K. C. Menzies will be president.

United States Coast Guard Headquarters, Washington, is asking bids until May 14 for one-story steel frame building, 71 ft. 4 in. x 261 ft. 4 in., with sheet metal siding; plans at office of United States Coast Guard Depot, Curtis Bay, Md.

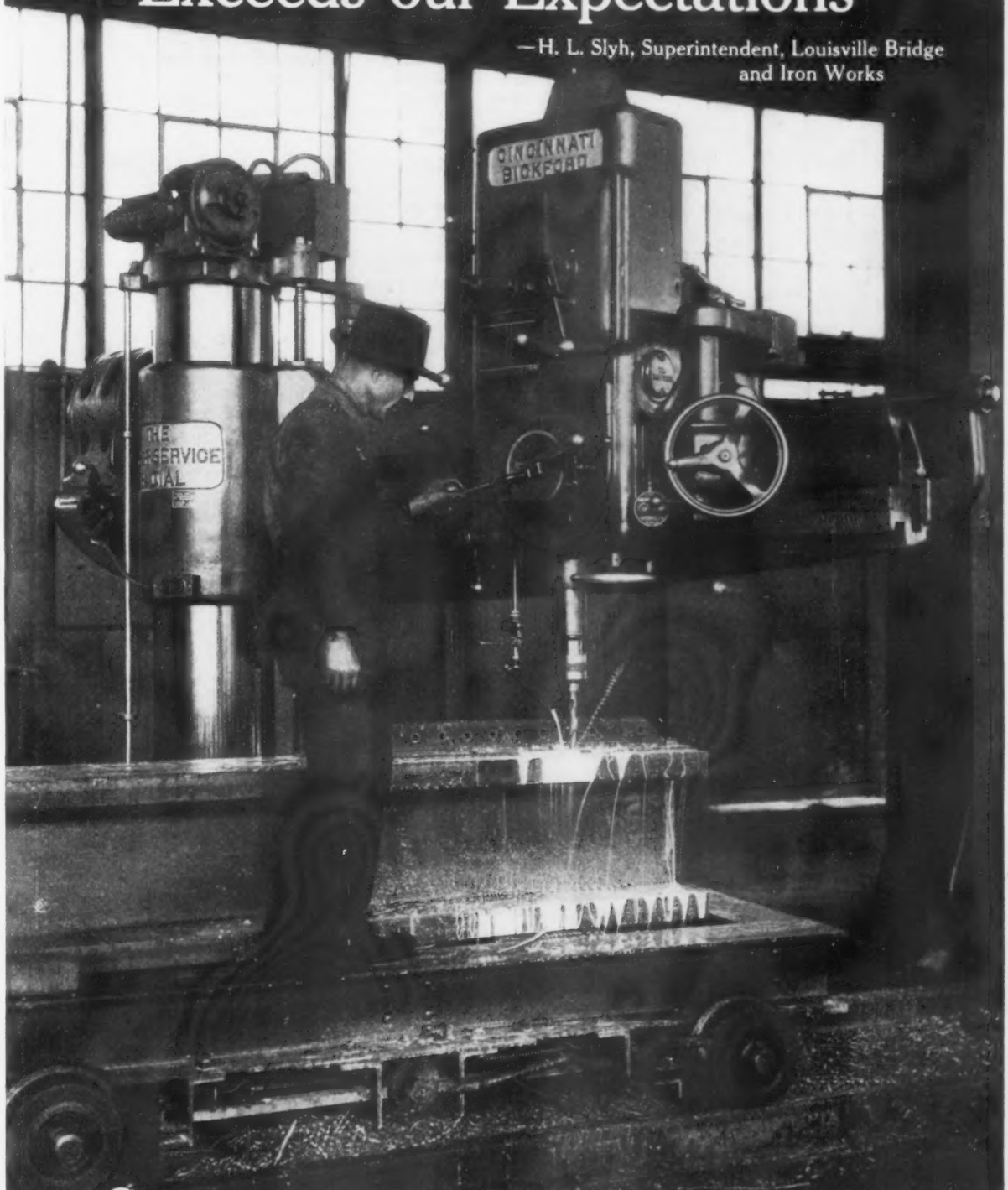
Board of Education, Norfolk, Va., plans installation of manual training equipment in new multi-story junior high school to cost $700,000, for which bids will be asked soon on general contract. Calrow, Browne & FitzGibbon, Royster Building, are architects.

General Purchasing Officer, Panama Canal, Washington, will receive bids until May 13 for one electric-operated blower, 200 transformers, 20 knife switches and auxiliary equipment; until May 21 for toggle switches, fuses, dredging pumps, lamp post parts, electric cutouts, fuse links and other equipment.

City Council, Brunswick, Ga., is considering new municipal airport, with hangars, repair shops, administration building, and other units, to cost about $200,000. Local Kiwanis Club is interested in project.

"Exceeds our Expectations"

—H. L. Slyh, Superintendent, Louisville Bridge and Iron Works



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THE CINCINNATI BICKFORD TOOL COMPANY ⁘ CINCINNATI, OHIO

Bureau of Supplies and Accounts, Navy Department, will open bids May 12 for 500 ¾-in. wide metal cutting band saws for Naval Aircraft Factory, Philadelphia; also for a 16-in. motor-driven engine lathe for Mare Island Navy Yard, Cal., and for a combination wood-working machine for naval air base, Long Beach, Cal.

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Buffalo

PLANS are under way by duPont Cellophane Co., Inc., River Road, Buffalo, manufacturer of transparent wrapping material, for multi-story additions, including remodeling part of adjoining plant of duPont Rayon Corpn., an affiliated organization, and installation of machinery for cellophane production. Expansion will cost close to $2,000,000.

Alco Products Inc., Dunkirk, N. Y., recently organized subsidiary of American Locomotive Co., 30 Church Street, New York, is carrying out expansion and improvement program for increased production of large diameter pipe, oil refining machinery, etc. An order for oil refining equipment totaling $1,250,000 has been secured from Russian Soviet Government. Company has also received contract from Kendall Refining Co., Bradford, Pa., for a 75,000-bbl. refinery distilling unit.

Dr. Howard L. Schrankel, Humboldt Avenue, Buffalo, and associates have organized Schrankel Gas Burner Co., Inc., with capital of $75,000, and plan operation of local factory for gas burners and gas-burning equipment. Clarence H. Leo, 130 Elmer Avenue, is one of incorporators.

United States Engineer Office, Buffalo, will receive bids until May 14 for one 150-kw. Diesel engine-generating set complete, with spare parts.

Department of Correction, State Office Building, Albany, N. Y., has awarded general contract to National Concrete Fire Proofing Co., Citizens Building, Cleveland, for one-story foundry, machine shop and other shop units at State Prison, Auburn, N. Y., at $406,000.

Dechler Die Casting Co., Batavia, N. Y., contemplates expansion and improvements at local plant during summer and early fall. Company is now running close to normal in all departments, giving employment to about 300 men.

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Chicago

CONTRACT has been let by Bell & Howell Co., 1803 Larchmont Avenue, Chicago, manufacturer of motion picture machines and equipment, parts, etc., to Schmidt Brothers Construction Co., 22 East Huron Street, for one-story top addition to plant, 112 x 153 ft., to cost over $70,000 with equipment.

John Morrell & Co., Ottumwa, Iowa, meat packers, are considering expansion and improvements at branch plant at Sioux Falls, S. D., to cost about $150,000 including equipment. Work will begin in summer.

Ellerbe & Co., Minnesota Building, St. Paul, Minn., architects, have awarded general contract to Paul Steenberg Construction Co., Builders' Exchange, for five-story and basement automobile service, repair and garage building, 100 x 130 ft., to cost about $200,000 including equipment.

Krone-Sebek Die Casting & Mfg. Co., 2935 West Forty-seventh Street, Chicago, has purchased Autodraulic Corpn., Chicago, manufacturer of automobile jacks and other automotive products, and will consolidate, retaining first-noted name. Company is planning expansion, particularly in connection with a hydraulic jack for automobiles, operated from instrument board.

Bureau of Reclamation, Denver, is asking bids until May 11 for one riveted steel surge tank, one steel sump tank and flume, one 7-ft. diameter aerator tank with accessories and one air vent pipe, 12 in. diameter and 45 ft. high, and accessories, for new Hoover Dam, Boulder City, Nev.

Board of Education, Duluth, Minn., has filed plans for a new steam power plant for central heating for public schools, to cost $85,000 with equipment. C. H. Smith, Torrey Building, is architect.

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Cleveland

CONTRACT has been let by J. H. Bowie Co., 2205 Inman Avenue, Cleveland, operating a general machine and metal-working shop, to C. A. Cargon Co., 5716 Euclid Avenue, for one and two-story addition, 48 x 77 ft., and 28 x 49 ft., to cost close to $35,000 with equipment.

Following recent purchase of pottery of Edwin M. Knowles China Co., Chester, W. Va., by Harker Pottery Co., East Liverpool, Ohio, plans are under way for expansion and improvements to cost over $150,000, including installation of three tunnel kilns, cars, pushers, conveying and other handling equipment. Harker company will move to new location.

Acme Steel Blanking Co., Toledo, Ohio, care of Morris M. Garfinkle, 338 Spitzer Building, recently organized by Joseph G. Gluck and associates, plans operation of factory for manufacture of steel specialties.

Zane Casting Co., Zanesville, Ohio, is considering early call for bids on general contract for three one-story units for foundry, machine shop and general storage and distributing service, to cost close to $45,000 including equipment.

Constantine Casket Co., Constantine, Mich., has awarded general contract to Comte-Nauman Co., 912 Summit Street, Toledo, Ohio, for three-story factory branch, storage and distributing plant at Toledo, to cost close to $70,000 with equipment. Mills, Rhines, Bellman & Nordhoff, Ohio Building, Toledo, are architects.

Ohio Power Co., Youngstown, has arranged for purchase of transmission lines and other property of Youngstown & Ohio River Railroad Co., near Lisbon and Salem, Ohio, and will consolidate with other properties in that section. Plans are under way for expansion and improvements, including new power and distributing lines.

Peerless Electric Co., Warren, Ohio, has received an order from Sears, Roebuck & Co. for fractional horse-power motors which will involve up to $250,000 with additional orders of same kind to follow.

Machinery, supplies and fixtures of Knight Mfg. Co., maker of saw mill machinery, Canton, Ohio, will be sold at public auction on May 14. Sale is under management of Industrial Plants Corpn., Columbus, Ohio.

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New England

BIDS have been asked on general contract by Connecticut Light & Power Co., Hartford, Conn., for three-story steam power plant at Bristol, Conn., including oil tanks, pipe lines, etc., to cost about $175,000 with equipment. H. A. Hayden, 175 North Main Street, Bristol, is architect.

Electric power machinery, conveying and other equipment will be installed in new central printing plant to be erected by Christian Science Publishing Society, 107 Falmouth Street, Boston, to cost over $2,000,000 with machinery. Chester Lindsay Churchill, 9 Newbury Street, is architect; Lockwood Greene Engineers, Inc., 24 Federal Street, is consulting engineer.

Howard H. Cooley, 10 High Street, Boston, and associates have organized Electrical Mfg. Corpn., to operate plant for manufacture of electrical equipment and appliances.

Roslindale Coal & Ice Co., 210 Florence Street, Roslindale, Boston, has purchased warehouse and distributing plant of Colonial Steel Co., 57 Fargo Street, South Boston, and will remodel for artificial ice-manufacturing plant, to cost over $65,000 with machinery.

School Committee, Department of Public Works, Holyoke, Mass., has secured low bid from Casper Ranger Construction Co., 20 Bond Street, for three-story vocational school, 70 x 230 ft., at $133,700, exclusive of equipment. List of equipment will soon be prepared.

O. J. Holt & Co., 4 Merrimack Street, Boston, manufacturers of automobile lamps, etc., have purchased factory at 16 Cambridge Street, Waverly, and will remodel for new plant and remove to new location.

Pratt & Whitney Aircraft Co., Hartford, Conn., has secured contract from War Department, Washington, for 292 Wasp airplane engines and spare parts at price of $1,153,083.

American Brass Co., Ansonia, Conn., has started erection of a one-story wire mill, 300 x 400 ft., to cost $450,000 with equipment.

Motor-driven compressors, condenser, pump, motor-driven blower and other equipment will be required for a refrigerating and ice-manufacturing plant at Chelsea, Mass., for Government naval hospital unit.

Sikorsky Aircraft Corpn., Bridgeport, Conn., has started production of amphibian planes, 46 passenger capacity, for transatlantic mail service. Company has tentative plans for additional equipment.

United States Naval Torpedo Station, Newport, R. I., will sell by sealed proposal quantity of material and equipment, including machine tools and scrap metals. Bids close May 12.

A Lift on the Road to Better Business

If you are faced with the stern necessity of making operating savings, let the specialists help. You will find their suggestions in the advertising pages of this issue. Practically every progressive company that specializes in helping manufacturers of metal products reduce costs by the use of superior equipment or materials, presents valuable ideas to you through The Iron Age.

Here are a few specimens of the wealth of ideas in this issue:

Now—a Welded Gear!

Rolled steel rim, web, arms and hub are welded together. Teeth are cut and machining operations are performed as usual.

One Operator and Helper Tend Eight Bolt Threaders

Hopper, magazine feed and automatic operation are responsible. Production per machine is 1800 bolts per hour.

Sizing by Pressure Saves Machining

New type coining press is said to be so powerful that many machining operations on drop forgings are eliminated.

New Collet Chuck of 1¾ in. Capacity

Self-contained, as the collet is drawn in by means of a conventional chuck wrench. May be adapted to old lathes as well as new.

Grinding Job That Took Hours Now Done in Minutes

New hydraulic shear blade grinder has a table speed up to 85 ft. per min.

To keep well-informed, read the advertising pages every week

Milwaukee

PLANS for new vocational school at Fourteenth and Clark Streets, Manitowoc, Wis., are being completed by William J. Raeuber, local architect, and bids will be asked about June 8. Building will be 80 x 220 ft., with wing, 52 x 100 ft., both two stories and basement. O. H. Senglaud is president, Vocational Board of Education.

General Machine Co., Milwaukee, has been incorporated with capital stock of $10,000 to succeed partnership of Lowe & Koch, general machinists, tool and die makers, 210 West Michigan Street. Principals are Edward L. Lowe, Erich F. Koch and Martin F. Hebein.

Wisconsin Public Service Corpn., Bellin Building, Green Bay, Wis., will build an addition, 42 x 44 ft., to its steam generating plant at Green Bay, to cost $50,000. O. J. Hannas is plant layout engineer.

Common Council, Evansville, Wis., is about to ask bids for construction and equipment of municipal sewage disposal plant designed by E. B. Parsons, consulting engineer, Watertown, Wis., to cost about $30,000.

Maj. Frank W. Mouso, secretary, St. John's Military Academy, Delafield, Wis., is taking bids for construction of new sewage disposal plant, to cost $25,000. C. S. Whitney, 724 East Mason Street, Milwaukee, is consulting engineer.

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Pittsburgh

PLANS are under way by Kendall Refining Co., Bradford, Pa., for extensions and improvements in local oil refinery, to double present output to cost close to $200,000. Work is scheduled to begin this month.

National Transit Pump & Machine Co., Oil City, Pa., manufacturer of pumping machinery, parts and other mechanical equipment, has superstructure under way for seven new plant units, each one story to cost over $500,000 with equipment. James H. Raymaker is general manager.

Dresser-Nordstrom Co., Bradford, Pa., has been organized with capital of 1,100,000 shares of stock, no par value, to consolidate S. R. Dresser Mfg. Co., Bradford, manufacturer of pipe couplings, clamps, sleeves, etc., and Merco-Nordstrom Valve Co., 343 Sansome Street, San Francisco, manufacturer of valves and kindred engineering specialties. Both plants will continue as heretofore and consolidated organization plans general expansion and development program. H. N. Mallon, president of Dresser company, will have same office in new organization. Fred A. Miller will be chairman of board.

Department of Public Works, Bureau of Water, City-County Building, Pittsburgh, is asking bids until May 14 for electrical control equipment and accessory apparatus for Herron Hill pumping station; also for boiler platforms and appurtenances for Ross pumping station. Edward G. Lang is director.

Board of County Commissioners, City-County Building, Pittsburgh, will proceed with construction of hangar building, with repair and reconditioning facilities and administration building at County airport, for which general contract recently was let to J. P. Ramella & Sons Contracting Co., Pittsburgh, at $172,253. Carl W. Forcier is manager at airport.

Board of Education, Bellevue, Pa., is asking bids until May 11 for manual training shop supplies, science department and other supplies for year 1931-32. J. Nelson Mowls, High School Building, is superintendent of schools.

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Cincinnati

PLANS are under way by Rendigs, Panzer & Martin, 519 Main Street, Cincinnati, architects, for a multi-story automobile equipment and supply building, to cost over $160,000 with equipment.

G. F. Vaughan Tobacco Co., Lexington, Ky., plans erection of a steam power plant in connection with tobacco redrying and stemming plant at Danville, Ky., to cost over $40,000 with equipment.

Contracting Officer, Wright Field, Dayton, Ohio, will receive bids until May 13 for one mechanical exhaust fan, with capacity of 31,000 cu. ft. a min.; May 18 for 143 electric drills, and May 11 for 20 adapter assemblies, gun mount and 60 magazine ammunition assemblies.

Bode Bodies, Inc., Cincinnati, has been organized by Albert Bode, George S. Avey and associates, to take over and expand company of same name, operating plant at 1655 Central Street for manufacture of motor truck and industrial bodies.

Board of Education, Covington, Ky., is considering installation of manual training equipment in three-story and basement high and grade school for colored students, to cost about $200,000, for which bids have been asked on general contract. E. C. Landberg, Eighth and Monmouth Streets, Newport, Ky., is architect.

Dixie Greyhound Lines and Smith Motor Coach Lines, 144 North Front Street, Memphis, Tenn., associated, have plans for a service, repair, garage and terminal building, to cost about $200,000. Jones & Furbinger, Porter Building, are architects.

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St. Louis

BIDS will soon be asked on revised plans by Busch-Sulzer Brothers Diesel Engine Co., Second and Utah Streets, St. Louis, for two one-story additions, 80 x 150 ft. and 90 x 90 ft., for machine shop and foundry, to cost over $125,000 with equipment. W. J. Knight & Co., Wainwright Building, are engineers.

Syms-Shafer Grocery Co., Colby, Kan., has plans for a two-story and basement cold storage and refrigerating plant, 60 x 265 ft., to cost close to $60,000 with machinery. Benjamin H. Byrnes, National Bank of America Building, Salina, Kan., is architect.

Kansas City Pulic Service Co., Grand Avenue and Fifteenth Street, Kansas City, Mo., operating local traction system, has arranged appropriation of about $80,000 for extensions and improvements in power transmission lines and new power substation.

St. Louis Meter & Pump Co., St. Louis, recently organized by C. C. Fredericks, 3745 Lindell Boulevard, and associates, with capital of $150,000, contemplates operation of plant for manufacture of pumping machinery, parts and other equipment.

Rodney Milling Co., Twenty-ninth Street and Southwest Boulevard, Kansas City, Mo., has taken out a permit for addition to grain elevator, to cost over $150,000 with equipment.

Board of Trustees, University of Nebraska, Lincoln, Neb., will soon begin a one-story and basement addition, 25 x 74 ft., to power plant, for central heating service, to cost over $65,000 with equipment. L. F. Seaton, superintendent, College of Agriculture, is in charge.

City Council, Lincoln, Neb., has been authorized to issue bonds for $2,300,000 for extensions and improvements in municipal waterworks, including sinking of wells at Platte River, near Ashland, Neb., about 25 miles distant, with installation of pumping machinery and power equipment, pipe lines, etc. City engineering department, City Hall, will be in charge.

Atchison, Topeka & Santa Fe Railway Co., 80 East Jackson Boulevard, Chicago, has awarded general contract to John S. Metcalf Co., 105 West Adams Street, Chicago, for addition to grain elevator in Argentine district, Kansas City, Mo., to cost about $750,000 with equipment. Elevator will be operated under lease by Davis-Noland-Merrill Grain Co., Board of Trade Building, Kansas City.

Board of Education, Joplin, Mo., plans installation of manual training equipment in new multi-story North Junior High School to cost $270,000, for which general contract has been let to Buchanan & North, Fort Smith, Ark. Thomas B. Williamson & Co., Topeka, Kan., are architects; B. F. Cook, 731 Linwood Boulevard, Kansas City, Mo., is consulting engineer.

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Gulf States

PLANS have been approved by Slack Petroleum Co., Tulsa, Okla., for erection of a new oil refinery at Willow Spring, Tex., with machine shop, boiler house and other units, to cost about $125,000 with machinery.

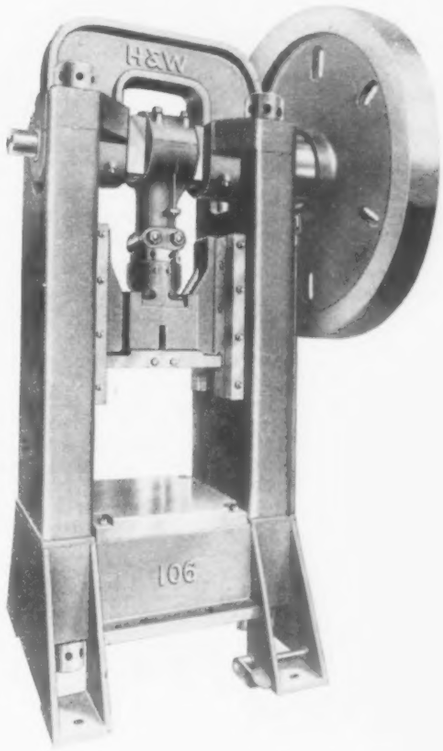
Southwest Engineering Co., Springfield, Mo., engineer, has plans for new grain elevator at Fort Worth, Tex., to cost over $250,000 with equipment. About two acres has been purchased for plant. Work is scheduled to begin early in August.

Masonite Corpn., Laurel, Miss., manufacturer of wallboard products, is considering one-story mill addition, to cost over $60,000 with equipment. Headquarters are at 111 West Washington Street, Chicago.

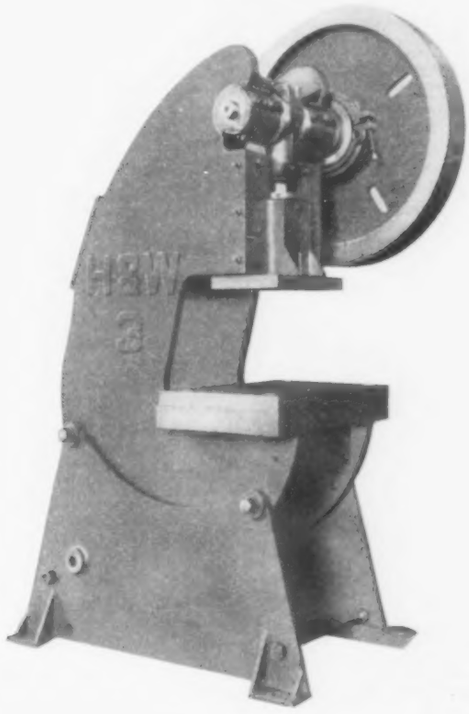
Beaumont Coca-Cola Bottling Co., 795 Main Street, Beaumont, Tex., plans installation of automatic bottling machinery, conveying and other equipment in new two-story and basement plant, 50 x 71 ft., with one-story automobile service, repair and garage building, 30 x 160 ft., for company motor trucks, to cost over $70,000 with equipment. Bids on general contract are being asked until May 12.

Deepwater Oil Refineries, Inc., First National Bank Building, Houston, Tex.,

Announcing a New Line of Steel Presses



A new and varied line of presses of welded steel construction is offered by the makers of the famous DIEING MACHINE. These presses are available in Straight Sided and Inclinable models and special presses can be constructed to meet particular requirements.



FRAME members and slide are constructed of welded steel, thus giving greater strength, rigidity and resistance to fatigue.

THESE presses combine the advantages incident to the use of welded steel construction with features of design and construction which have been proven advantageous in presses of cast iron construction. Various special features are also included.

Straight Sided Presses are built with hollow rectangular welded steel uprights, internally braced, and containing shrunk-in steel tie rods, thereby eliminating possibility of stretch and giving great resistance to deflection in case of eccentric loading. This construction combines the advantages of the tie rod type press with the advantages obtainable by the use of welded steel frame members.

All welded steel parts are constructed of specially made welding quality steel. These parts are thoroughly annealed before machining, thus eliminating possibility of strains.

Such features as heat treated hammered alloy steel forged crankshafts, bronze bushed crankshaft bearings and connections, and roller bearings on other shafts also aid toward making these presses machines of the highest quality.

Write for Catalog

THE HENRY & WRIGHT MANUFACTURING COMPANY

Hartford, Connecticut

has leased property at Jacksonville, Fla., for establishment of new bulk oil storage and distributing plant, to cost over $75,000 with equipment.

City Council, Port Arthur, Tex., is considering installation of electric-operated pumping machinery and auxiliary equipment in connection with expansion and improvements at municipal waterworks, to cost $125,000. City engineering department will be in charge.

Kouri Brothers, Wichita Falls, Tex., operating oil properties, have begun work on new oil refinery at Gladewater, Tex., to cost over $90,000 with equipment.

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Detroit

FOLLOWING acquisition of plant of United States Pressed Steel Co., Ypsilanti, Mich., by Ford Motor Co., Dearborn, purchasing company is dismantling property and will remodel for new mill for fabric and allied production for Ford automobiles.

Detroit Electric Car Co., Piquette Avenue, Detroit, manufacturer of storage battery industrial cars, etc., has taken over property at 1601 Lafayette Boulevard, and will move to that location where expansion will be carried out, with installation of additional equipment.

Michigan Rolling Mills & Products Corpn., 1010 Ford Building, Detroit, recently organized, contemplates early operation of local mill for manufacture of iron and steel products, also brass, copper and other metal goods. Company is headed by Ludwig Wolffgram and Eric Steil.

Heath Aircraft Corpn., 1727 Sedgwick Street, Chicago, manufacturer of small type aircraft, accessories, etc., has secured property at Niles, Mich., and plans early removal to that location, where expansion will be carried out, including installation of additional equipment in parts and assembling departments.

Formed Screw Products Co., 13835 Jennings Avenue, Detroit, recently organized, plans operation of local factory for manufacture of machine and screw products, and other metal specialties. Howard A. Hayden, 12380 Wisconsin Avenue, and Alfred Mason, head new company.

Detroit Gray Iron Foundry Co., 6403 Wight Street, Detroit, is considering one-story addition, 115 x 165 ft., to cost over $60,000 with equipment.

Roosevelt Oil Co., Mount Pleasant, Mich., will build one-story addition to local oil works, for blending, storage and distributing service, to cost over $30,000 with equipment.

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Indiana

BIDS are being asked until May 15 by C. C. Shipp, 230 East Ohio Street, Indianapolis, for hydroelectric generating plant on Flat Rock River, Monroe mill site, Shelby County, including two water turbines and generators, accessories, two tainter gates, head gates, crane and hoists; also power dam, 20 x 238 ft. Project will cost over $600,000 with transmission system. Shaeffer & Gift, Castle Hall Building, Indianapolis, are consulting engineers in charge.

Moynahan Construction Co., Union Title Building, Fort Wayne, has been awarded contract for three-story and basement automobile service, repair and garage building, to cost about $400,000 with equipment.

Indiana Electric Screen Co., Indianapolis, recently organized by Otto Lay, 407 West Bernard Street, and associates, plans operation of factory for manufacture of screening equipment, wire cloth products, animal traps, etc.

Board of Trustees, University of Notre Dame, Notre Dame, has plans for new two and three-story engineering building, to be known as John F. Cushing Hall of Engineering, with machine shops, laboratories and other mechanical departments. Appropriation of $300,000 has been secured for project. Francis Kervick, professor of architecture at institution, is architect.

Board of Education, East Gary, has authorized installation of manual training equipment in new two-story and basement high school to cost about $100,000, for which plans have been completed by Wainwright & Wilkins, Lloyd Building, Hammond, Ind., architects.

Indianapolis Industrial Center, Inc., Nineteenth Street and Martindale Avenue, Indianapolis, is planning extensions in steam-operated power plant to double present capacity, to cost over $65,000 with equipment.

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Pacific Coast

BOARD of Education, Los Angeles, has authorized Sumner P. Hunt, Laughlin Building, architect, to prepare plans for additions to Virgil Junior High School, including a vocational shop unit, to cost about $100,000. Plans have also been authorized for enlargements in John C. Fremont High School, including new shop unit, for which $100,000 is available. Edwin Bergstrom, Citizens National Bank Building, is architect for last noted.

Jacob W. Bird Co., Woodland, Cal., H. C. Schrader, general manager, manufacturer of deep-well pumping machinery and parts, is considering a new one-story plant, to cost over $35,000 with equipment.

Orange Ice & Cold Storage Co., Orange, Cal., has plans for a one-story addition to ice-manufacturing plant, 40 x 60 ft., with installation of 35-ton tank, crane and hoist, chute, can table and other equipment, to cost close to $40,000.

National Motor Inns, 1035 Russ Building, San Francisco, has plans for six new automobile service, repair and garage buildings in different cities, each to cost over $150,000 with equipment. Raymond W. Jeans, 605 Market Street, San Francisco, is architect. George L. Leiter, 3700 West Street, Oakland, Cal., will be in charge of construction.

Pacific Car & Foundry Co., Seattle, has purchased plant and business of Arrow Pump Co., Seattle, manufacturer of pumping machinery, parts, etc., and will consolidate with its works at Renton, Wash. Pacific Car company is occupying former plant of Bacon & Matheson Co., Renton, recently acquired.

Kirkland Packing Co., Kirkland, Wash., plans installation of conveying and other handling equipment in connection with rebuilding fruit packing plant, recently destroyed by fire, to cost over $100,000. Benjamin Hershey is general manager.

Barbee Dry Dock & Ship Building Corpn., Seattle, is considering rebuilding plant recently destroyed by fire, with loss over $100,000 including equipment.

Standard Ice Co., 4224 District Boulevard, Vernon, Cal., is planning one-story ice-manufacturing plant at Newport Beach, Cal., to cost close to $60,000 with machinery.

Pacific Hardstone Brick Co., 416 West Eighth Street, Los Angeles, is planning erection of new plant on 40-acre tract, with steam power station, machine shop and other units, to cost about $70,000 with machinery. Murray T. Cox is company representative.

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Canada

ERECTION of a 50-ton mill is contemplated by Central Patricia Gold Mines, Ltd., Canada Permanent Building, Toronto, at its property in Patricia district. F. J. Connell is president.

Canusa Mining & Exploration Co., Ltd., Metropolitan Building, Toronto, F. Miller, president, is considering erection of a 50 to 100-ton mill near South Porcupine, Ont.

St. Anthony Gold Mines, Ltd., Toronto General Trusts Building, Toronto, has plans for erection of a 1000-hp. hydroelectric power plant and 125-ton cyanide milling plant at its property at Sturgeon Lake, Ont. Work will be started at once. T. S. H. Giles is secretary-treasurer.

Canadian Utilities, Ltd., Prince Albert, Sask., will spend $200,000 on plant addition and renewing distributing system. W. J. Murphy is manager.

London Rolling Mills, Co., Ltd., London, Ont., recently purchased by John Morrow Screw & Nut Co., Ltd., and Ingersoll Machine Tool Co., Ltd., Ingersoll, Ont., plans alterations and improvements to plant costing $40,000. A new furnace will be built and equipment installed for manufacture of alloy and cold drawn steel.

Acme Brick Co., Ltd., Alberta Block, Edmonton, Alta., will spend $25,000 on plant improvements.

Tallman Brass & Metal Ltd., Hamilton, Ont., has effected reorganization of plant and personnel following appointment of G. T. Clarkson as receiver and manager. Company's die-casting plant, which utilizes Doehler process, has been revamped to handle a larger volume of this class of business. It is also equipped to manufacture metal stampings, spinnings, brass and bronze castings, solid and cored bars.

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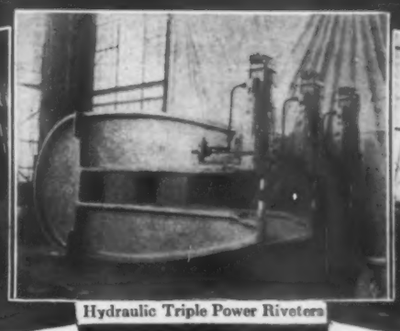
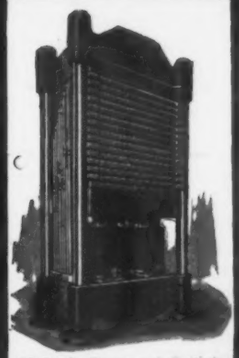
Foreign

APPLICATION has been made by Consolidated Mining, Smelting & Power Corpn., London, England, to Provincial Government of Alberta, Canada, for permission to erect an electric generating plant about 30 miles from Turner Valley, to operate with natural gas as fuel, secured from wells in Turner Valley district. Initial plant will have capacity of 70,000 hp., and will cost over $5,000,000 with pipe lines and transmission system. R. Crowe-Swords, Vancouver, B. C., is representative for company.

Hydraulic Wheel Press

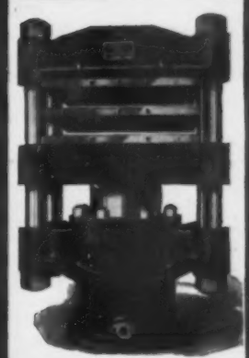

Hydraulic Triple Power Riveters

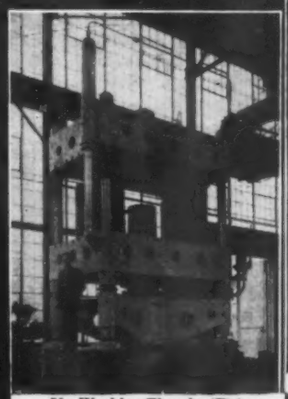
Hydraulic Straightening Press


Multiple Opening 4-Cylinder Steam Platen Press

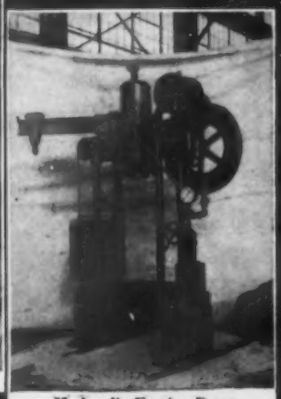
ABILITY *plus* RELIABILITY

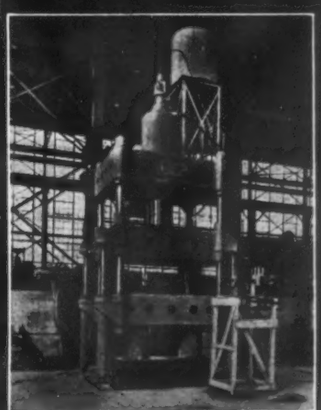
THE successful designing and building of such representative machines as these are the result of intelligently organized ingenuity founded upon the extensive knowledge gained in more than a century of specialized engineering experience—hence the *reliable performance* of our engineers in meeting their problems squarely—and the *reliable performance* of Wood-built machinery in many lines of industry.


2-Opening Steam Platen Press


Up-Working Flanging Press

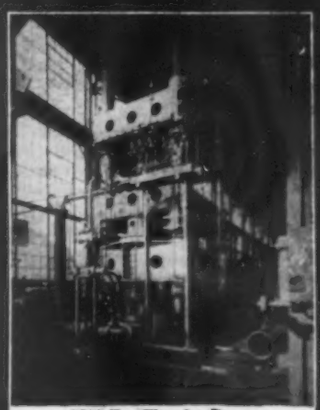
Automatic Gas Producer


Hydraulic Forcing Press


Down-Working Flanging Press

R. D.
WOOD
& COMPANY

PHILADELPHIA
ENGINEERS — IRON FOUNDERS — MACHINISTS
In business continuously since 1803
Designers and Builders of
Hydraulic Machinery—Automatic Gas Producers—Gas Washers—General Machinery of every Description
Cast Iron Pipe—SAND-SPUN (Centrifugally Cast) and Pit Cast—Mathews Fire Hydrants—Gate Valves


2500-Ton Flanging Press

Business as Others See It

Digest of Current Financial and Economic Opinion

IF the depression leaves behind it any well-established practical conclusions, the most emphatic of them should be the fallacy of expecting a population growing at the rate of less than 2 per cent a year to continue to absorb goods mounting up at the rate of 4 to 6 per cent annually, at artificial prices.

Thus does the Silberling Research Corpn. express its view of one of the fundamental causes of the business debacle — adding: "Readjustment of retail prices is now the critical focus of the situation, and its program will largely determine how the depleted incomes of wage earners and investors alike will again be able to absorb the normal volume of goods." And it warns against leaning on the broken reed of "public works and publicly stimulated construction." Physical volume of trade is reported maintained to a much greater extent than is dollar value of sales.

Wholesale merchandise markets continue fairly active, in the view of the New York *Times*, "though at present they are fluctuating quite closely with weather conditions." That writer looks favorably upon Mr. Barnes's suggestion of a central agency to coordinate industries, with a view to reducing wide fluctuations in business activity.

Labor Is Still Embattled

Wage scales are receiving extended attention. Most writers deplore what many regard as a prime necessity if industry is to pull itself out. *Business Week* sees no necessary relation between wages and cost of living. "The purchasing power of employed workers always increases, and should increase, during depression. This is one of the factors of recovery, because it helps offset the lost purchasing power of the unemployed."

And the *Times* notes that the opinion that wages should not be cut except as a last resort is "in sharp contrast to the view entertained by a very small minority—that our living standards are too high and must be brought down."

But the insistence on maintenance of railroad wage rates is still held, by *Financial Chronicle*, as a sprag in the wheels of progress toward a solution of our difficulties. The railroad brotherhoods, it says "resolutely refuse to enter into any spirit of cooperation. By this attitude they . . . not only retard recovery but tend to accentuate the prevailing depression."

And Standard Statistics Co. believes the wage scale is weakening and that this movement will become somewhat intensified before fall.

A stagnant summer is regarded as the probable outcome of current movements, though several indexes show fractional improvement. Better car-loadings are reported. But First National Bank, Boston, thinks the peak of spring industrial activities is definitely past for this season.

Light Sought from History

Basing on the history of earlier depressions, Harvard Economic Society reasons from stock market operations: "If the decline in stocks brings the average for May below that for last December, it will add to the evidence indicating that business recovery will be gradual. . . . Recent developments have caused sufficient uncertainty and unsettlement to moderate the rate of business recovery, even if they do not postpone the time." But "the decline in stocks which already has taken place will not necessarily prolong the decline in business volumes or postpone the date of the upturn."

Alexander Hamilton Institute has been tracing history, too. Using loanable funds, staggered one year ahead of business activity, it concludes that, if the December low was not the nadir, we shall experience it before the time for the usual fall improvement to set in.

While the money value of this year's agricultural output is estimated at only half that of 1930 (*Commerce and Finance*), the American Federation of Labor notes that employment is better and, industrially, "constructive factors are strong."

Following call for bids for construction of power dam at Dique San Roque, Province of Cordoba, by Ministry of Public Works of Cordoba, Argentine Republic, until May 12, it is proposed to complete plans for new hydroelectric generating plant of 10,000-hp. capacity, for service to city of Cordoba and vicinity. Bids for machinery will be called later. Argentine Consulate General, 17 Battery Place, New York, has plans and information.

Showa Hiryo Kabushiki Kaisha, Tokyo, Japan, operated by Tokyo Electric Light Co., Tokyo, and affiliated interests, has begun erection of new plant at Kawasaki for production of sulphate of ammonia, to cost close to 14,000,000 yen (about $7,000,000).

American & Foreign Power Corpn., 2 Rector Street, New York, operated by Electric Bond & Share Co., same address, through its subsidiary, Compagna Colombiana Electridad, Bogota, Colombia, has purchased municipal power plants at Zipaguira, Chia Cajica, Nemocon and Cogua, vicinity of Bogota, and will consolidate. Expansion is planned in districts noted, including transmission lines.

Publishers of *La Prensa*, Buenos Aires, Argentine Republic (daily newspaper), has placed order with R. Hoe & Co., 138th Street and East River, New York, for construction of printing press, consisting of 21 double printing units, at price of $800,000. Press will be installed for general expansion at plant, with installation of considerable auxiliary equipment. Ezequiel Paz is head of publishing company.

New Trade Publications

Indicating Temperature Controller.—Brown Instrument Co., Philadelphia. Broadside describing and illustrating the new indicating instrument for automatically controlling relatively high temperature processes and units such as heat treating furnaces, enameling furnaces, oil stills and towers, brick and pottery kilns, glass furnaces and galvanizing tanks.

Stokers.—Hoffman Combustion Engineering Co., 410 Ford Building, Detroit. A 24-page illustrated catalog, which includes photographs of several suggested layouts with various types of boilers ranging from 70 to 700 hp.

Pumps.—Worthington Pump & Machinery Corpn., Harrison, N. J. Three specification sheets: Oil pumps of the horizontal duplex piston pattern, Type S. P., for 150 lb. steam, 750 to 1500 lb. liquid end pressure; hot oil pumps of the same type for hot feed or hot flash service at temperatures up to 700 deg.; vertical triplex single-acting power pumps, instructions and parts lists.

Surface Condensers. — Worthington Pump & Machinery Corpn., Harrison, N. J. Specification sheet covering folded tube layer type for turbo-generator service with turbine-driven circulating pump, steam air ejector for air removal and motor-driven hotwell pump.

Rotary Converter.—Roth Brothers & Co., 1400 West Adams Street, Chicago. Circular dealing with Century-Roth inverted rotary converters for use in furnishing alternating current for spot welding machines, X-ray equipment, radio power systems, etc.